

Exemption 6

SAMPLING AND ANALYSIS PLAN

FOR

**RCRA SITE SAMPLING VISIT AT
FORMER C.W. PROCESS COMPANY;
AKA WAYNE MANUFACTURING
(EPA ID No. IAD005277256)
Cedar Rapids, Iowa**

**IN SUPPORT OF
THE U.S. ENVIRONMENTAL PROTECTION AGENCY REGION 7**

**UNDER
RCRA ENFORCEMENT, PERMITTING, AND ASSISTANCE
(REPA4) CONTRACT
ZONE 3, REGION 7**

Task Order R7031

**DOCUMENT CONTROL NUMBER
REPA4-1731-013**

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Booz | Allen | Hamilton

ACC

The following persons approve the contents of this *Sampling and Analysis Plan for the RCRA Site Sampling Visit at the Former C.W. Process Company; AKA Wayne Manufacturing, Cedar Rapids, Iowa* and are committed to implementing the provisions described herein:

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DISTRIBUTION

Booz Allen PQAM
Booz Allen TOM
EPA Region 7 TOCOR

1. INTRODUCTION

Under the U.S. Environmental Protection Agency (EPA) RCRA Enforcement, Permitting, and Assistance (REPA4) Contract, Booz Allen Hamilton (Booz Allen) has been requested under Task Order (TO) R0731 to support the collection and analysis of environmental samples of various media at 15 sites located in the State of Iowa. Due to known and suspected soil and groundwater contamination at these 15 sites, groundwater, sediment, surface soil, subsurface soil, and/or surface water samples will be collected. Analytical results from these samples will be used by EPA to determine whether site remediation is necessary.

This document presents the Sampling and Analysis Plan (SAP) for sample collection activities at the former C.W. Process Company site, also known as (AKA) the Wayne Manufacturing site (herein referred to as C.W. Process). This SAP documents the site background, sampling design, sampling procedures, analytical procedures, and quality control elements specific to the sample collection activities at C.W. Process. This SAP also includes site-specific Data Quality Objectives (Appendix A), technical Standard Operating Procedures (SOPs) (Appendix B), a site-specific Health and Safety Plan (HASP) (Appendix C), and site location and sampling location maps (Appendix D).

Detailed information about Booz Allen's general quality assurance (QA) and quality control (QC) protocols for sampling and analysis activities for this TO are presented in the Booz Allen *Quality Assurance Project Plan for RCRA Site Sampling Visits in Iowa* (RCRA Site Sampling Visits in Iowa QAPP) dated June 25, 2010. This site-specific SAP will not duplicate information provided in the RCRA Site Sampling Visits in Iowa QAPP; it will supplement the plan with information that is specific to this site. Both this site-specific SAP and the RCRA Site Sampling Visits QAPP are subordinate to and consistent with the REPA4 Quality Management Plan (QMP). In this manner, Booz Allen provides a comprehensive and consistent environmental QA/QC program with sufficient flexibility to meet the particular requirements of Region 7 and the circumstances of this TO.

The RCRA Site Sampling Visits in Iowa QAPP outlines the general requirements and protocols for environmental sampling and analysis activities performed under this TO. It was designed to be consistent with *EPA Requirements for Quality Assurance Project Plans* (QA/R-5), *EPA Guidance for Quality Assurance Project Plans* (QA/G-5), *EPA Quality Manual for Environmental Programs* (EPA 5360), and *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs* (ANSI/ASQC E4-1994).

This SAP is designed to supplement the RCRA Site Sampling Visits in Iowa QAPP by providing site-specific QAPP element information specific to the planned activities at C.W. Process. In order to facilitate a smooth comparison and transition between the two plans, this SAP is presented in the same format as the RCRA Site Sampling Visits in Iowa QAPP (including all sections and subsections). If a particular section or subsection of this SAP is described in the RCRA Site Sampling Visits in Iowa QAPP or is not applicable to the C.W. Process site, the SAP will state this under the section/subsection.

In the event of conflicting requirements, the Booz Allen Program QA Manager (PQAM) will be notified and the order of precedence will be the Performance Work Statement (PWS), this site-specific SAP, the RCRA Site Sampling Visits in Iowa QAPP, and the QMP. All of these documents will take precedence over previously existing QAPPs or standard operating procedures (SOP).

2. GROUP A ELEMENTS: PROJECT MANAGEMENT

This section addresses the key project management components for this task order.

2.1 TITLE AND APPROVAL SHEET

This SAP includes a title and approval page. This page includes the plan title and project name; the names of the implementing organizations; the names, titles, and signatures of approving authorities; and their approval dates. Required approvals include the Booz Allen REPA4 Program QA Manager (PQAM), the Booz Allen Task Order Manager (TOM), and the EPA Region 7 Task Order Contracting Officer's Representative (TOCOR). This SAP will not be implemented until these approvals have been obtained. Subsequent revisions to the approved SAP will be subject to the same level of review and approval as the original.

2.2 TABLE OF CONTENTS AND DOCUMENT CONTROL FORMAT

This SAP includes a table of contents, which lists each numbered section, figures, tables, references, and appendices. This SAP follows the same format as the RCRA Site Sampling Visits in Iowa QAPP, including the document control header and footer. Where a major QAPP element is described in full in the RCRA Site Sampling Visits in Iowa QAPP, the element is included in the site-specific SAP with a reference to the QAPP. Where a major QAPP element is not applicable, the element is included in the site-specific SAP along with a brief statement or explanation of why it is not applicable.

2.3 DISTRIBUTION LIST

In accordance with the REPA4 QMP, the distribution of this SAP will be controlled to ensure that implementing individuals have direct access to the most recently-approved version. The SAP, therefore, will include the list of individuals to whom the plan and subsequent revisions will be issued. Recipients include the SAP signatories. It is the responsibility of the implementing individuals to ensure that other key TO personnel (e.g., EPA Region 7 Laboratory, subcontractor personnel) receives the most recently-approved version of this SAP.

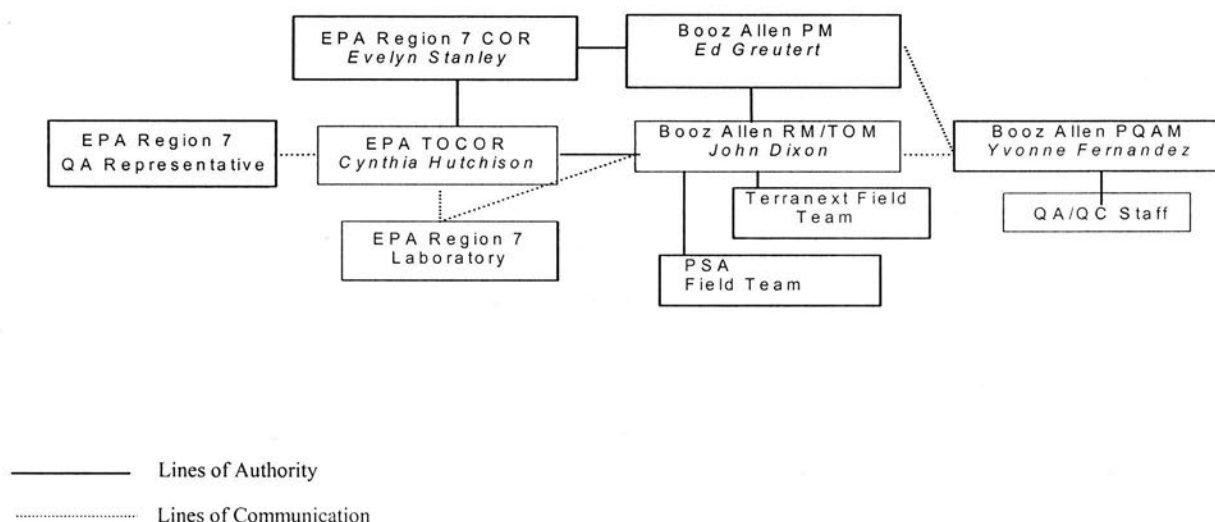
2.4 PROJECT ORGANIZATION

This section identifies the individuals and organizations responsible for the planning and execution of field operations, laboratory services, and data reporting. The TO organization for this activities at this site is depicted in Figure 1. The REPA4 QMP and RCRA Site Sampling Visits in Iowa QAPP provide a full description of all program-level and TO-level functions. Below is a summary of the TO organization specific to this site.

Four sampling staff (Booz Allen TOM, two Terranext staff, and one PSA Environmental Geoprobe operator) will travel to the C.W. Process site in Cedar Rapids, Iowa to collect environmental samples of various media. The EPA TOCOR will not be present at the site during the sampling visit. However, the EPA TOCOR is expected to provide specific direction prior to the sampling event and technical direction in the field, if needed.

The EPA Region 7 Laboratory located in Kansas City, Kansas will be responsible for conducting chemical analyses of the samples collected under this SAP and for reviewing the resulting data. Upon receipt of the analytical data from the EPA Region 7 Laboratory, a Sampling Report that documents field activities and presents the analytical data will be developed by Booz Allen and submitted to EPA. EPA will be responsible for performing or procuring data validation services, if desired.

Figure 1. REPA4 Organization for TO 7031; C.W. Process



2.5 PROBLEM DEFINITION/BACKGROUND

The Booz Allen TOM reviewed the EPA Region 7 files for the C.W. Process site on June 17, 2010 and June 28, 2010 to obtain relevant background information on the site. The Booz Allen TOM also participated in a meeting with the EPA TOCOR on June 28, 2010 to discuss the history and planned sampling approach at the site. The following discussion, which presents the site background and problem definition, is based on the file reviews and discussion with the EPA TOCOR.

2.5.1 Site Description

C.W. Process is located at 5051 Williams Boulevard S.W. in Cedar Rapids, Iowa. The facility consists of one vacant house on partial basement with a nearby, metal manufacturing building constructed over concrete floors with several small attached storage sheds. The house covers approximately 1,800-square-feet and the metal building covers approximately 4,500-square-feet. Several other storage buildings are located on the site, which also contains approximately 23 acres of farm land. Until recently, the site was operated by C.W. Process for the manufacturing of hammer handles.

2.5.2 Operational Information

The EPA files contain little information of the operational history of the C.W. Process facility. Records show that Wayne Manufacturing began treatment of cyanide wastes at the facility in 1956. The wastes were produced during the manufacturing of fiberglass and tubular steel hammer handles. Around 1995, the facility changed its name to C.W. Process Company, and continued operations for an unknown period of time. It is unclear when operations ceased at the C.W. Process facility. However, Phase II Site Assessments conducted on behalf of C.W. Process in 2004 and 2005 describe the facility as vacant. Currently, no manufacturing operations occur at the former C.W. Process site.

2.5.3 Environmental Setting

The EPA files contain little information on the environmental setting at C.W. Process. A topographic map was downloaded from the Iowa Geographic Map Server (Iowa State University GIS Support and Research Facility) and is included in Appendix D. From this map, the site is located between two, unnamed tributaries of Prairie Creek (located to the south of the site). Surface drainage appears to flow to the southwest toward the westernmost unnamed tributary.

During Phase II Site Investigations conducted in 2004 and 2005, temporary groundwater wells were advanced at the site. From the borehole logs, it appears that the site is underlain with 6 to 8 inches of fill. Beneath the fill is sandy clay, with groundwater generally encountered at three to six feet below ground surface (bgs). During the 2005 Phase II Site Investigation, the static groundwater levels were plotted, revealing groundwater flow is generally to the southwest.

The C.W. Process site is surrounded by farm land to the east and west. Residences are present to the north and south. The nearest residence (other than the onsite residence) is approximately 300 feet to the north-northwest. A row of houses is present downgradient of the site, across 33rd Avenue (approximately 400 feet to the south). The 2005 Phase II Site Investigation reported several of the residences to the south have private groundwater wells and use the groundwater for potable purposes.

2.5.4 Environmental Investigation History

The following is a summary of the EPA file material related to environmental investigations at C.W. Process. An initial Notification of Hazardous Waste Activity was submitted to EPA on August 5, 1980, stating Wayne Manufacturing was a treatment, storage, and disposal (TSD) facility. On August 30, 1982, Wayne Manufacturing submitted a closure and post-closure plan for the facility. However, the closure and post-closure plans were not addressed by the State or EPA. On February 14, 1984, Wayne Manufacturing notified the State of Iowa that it wished to terminate its Part A permit application. The State of Iowa requested closure of three hazardous waste storage areas (identified as a storage shed, an outside storage, and a drum storage area), as well as post-closure liability and financial assurance. No response to this request is contained in the EPA files.

EPA conducted Compliance Evaluation Inspections (CEIs) at the C.W. Process facility in 1986 and 1988. The 1986 CEI identified a treatment pond that had been filled with soil which historically received wastewater from a ferrous sulfate cyanide complexing operation. The 1988 CEI identified various other F006 hazardous waste storage areas and onsite disposal of treated hazardous waste. EPA requested a Part B permit application in May 1988. The EPA files do not contain a Part B application for the facility.

A RCRA Facility Assessment (RFA) was submitted from Wayne Manufacturing in April 1992. The RFA identified the following SWMUs: two above-ground tanks, barrel storage area, transfer areas, and a waste recycling area. No sampling was recommended in the RFA.

A follow-up inspection was conducted on May 5, 1992. During this follow-up inspection, a floor drain in the heat treatment room was identified. The floor drain was reportedly plugged in 1991 to become a sump. Prior to 1991, the drain reportedly discharged through a septic tank and into a nearby stream.

In January 1993, a Preliminary Assessment was conducted. The Preliminary Assessment identified 10 SWMUs:

- North Drum Storage Area
- Steel Evaporator Tub for Non-Cyanide Waste
- Heat Furnace for Cyanide Waste
- Rinse Drums
- Quench Oil Drip Catcher
- Cyanide Wastewater Evaporator
- South Drums Storage Area
- Corrugated Metal Shed
- Quench Oil/Water Separator
- Drainage Collection Sump

No sampling was recommended in the 1993 Preliminary Assessment report.

On September 29, 1993, a CEI was conducted which identified storage of hazardous waste for longer than 180 days and operating an illegal TSD facility. EPA issued an Order and Notice of Complaint to Wayne Manufacturing for operating a TSD facility without a RCRA permit, failure to maintain the integrity of hazardous waste storage containers, and failure to properly manage hazardous waste storage containers.

Sometime around 1995, the company changed names to C.W. Process. C.W. Process submitted a revised Closure Plan for Furnace No. 2 and the Drum Storage Area in September 1994. Another revision was submitted in August 1996, which included an evaporator dry-down area and drum staging area south of the manufacturing plant. Closure Certification for each of these areas was submitted to EPA on January 30, 1997.

A gap exists in the EPA files from 1997 through 2004. On July 17, 2004, consultants for the [REDACTED] Estate submitted a Phase II Site Investigation Report for the C.W. Process Site. This Phase II Site Investigation Report referenced a Phase I Environmental Assessment report, dated January 7, 2004, which was not in the EPA files. The Phase I Environmental Assessment identified the closed areas of the facility, plus Furnace No. 1, a former treatment pond, above-ground storage tanks, hundreds of mostly-empty drums, and other scrap yard items as recognized environmental conditions.

During the Phase II Site Investigation, seven soil samples, one onsite tap water, and three groundwater samples were collected. Soil samples were analyzed for total cyanide. Water samples were analyzed for volatile organic compounds (VOCs), RCRA metals, total cyanide, and total extractable hydrocarbons as diesel and motor oil. Cyanide was detected in all soil samples at levels ranging from 2.5 to 296 milligrams per kilogram (below closure standards and statewide standards). No contaminants were detected in the drinking water sample. However, all three groundwater samples (collected from temporary wells installed at the site) showed cyanide detections in excess of the statewide standard of 0.2 milligrams per liter (mg/L). The groundwater cyanide concentrations ranged from 4.68 mg/L to 380 mg/L. Diesel and motor oil were also shown to exceed statewide standards, but at a much lesser degree.

A follow-up Phase II Site Investigation was conducted to further delineate the nature and extent of cyanide contamination in groundwater at the C.W. Process site. The second Phase II Site Investigation report, dated March 30, 2005, described the collection of another drinking water sample from a neighboring residence to the east, as well as four additional groundwater samples. All water samples were analyzed for total cyanide. Cyanide concentrations at three of the four temporary groundwater wells were in excess of the 0.2 mg/L statewide standard (detections up to 22.2 mg/L). The source of groundwater contamination was determined to be the former treatment pond (lagoon) which has been covered with soil and formerly received treated cyanide wastes. Static groundwater levels encountered in the Phase II temporary groundwater wells were plotted to determine groundwater flow direction (determined to be to the southwest). The plume size was estimated, and a generic plume map was created. The Phase II report also stated that several neighboring residences use private groundwater wells to obtain drinking water.

Appendix D contains the Phase II sampling locations map, map of the property and adjacent residential properties, the groundwater flow direction map, and the generic plume map.

2.5.5 Problem Definition

Soil samples collected near the manufacturing area during the two Phase II investigations have not exhibited significant contamination. However, cyanide contamination in groundwater has been characterized at concentrations three orders of magnitude greater than the statewide standard of 0.2 mg/L. The source has been identified as the former treatment pond south of the manufacturing area. At this time, the downgradient extent of the groundwater plume has not been defined. Based on the groundwater flow and plume maps contained in the March 30, 2005 Phase II Site Investigation Report, the cyanide contamination appears to be flowing south, toward residential areas (which reportedly use private groundwater wells to obtain drinking water).

The May 5, 1992 follow-up inspection also identified a floor drain in the heat treatment room, which discharged through a septic tank and into a nearby stream. No surface water, sediment, or soil samples have been taken from the drainage swale leading to the nearby stream or from the stream itself. It is unknown if cyanide or RCRA metals contamination has reached these areas.

EPA would now like to determine the extent of cyanide and RCRA metals contamination at the site, and if the contamination has reached the property boundaries. This SAP addresses the procedures and methods to be used for the sample collection and analysis activities at the C.W. Process site. The resulting data will be screened against EPA Regional Screening Levels (RSLs) to determine the extent of contamination and if further investigation or remediation is required at the site.

It should be noted that the groundwater samples will be collected as grab samples with a peristaltic pump through a Geoprobe screen point sampler. Temporary or permanent groundwater wells will not be installed. While the installation, development, purging, and sampling of groundwater wells would result in more definitive groundwater analyses, the grab sampling methods described in this SAP result in a quality of data suitable for EPA's intended use (determination if contamination is present in excess of the RSLs and if further investigation/remediation is required).

2.6 PROJECT/TASK DESCRIPTION

The scope of work for this site includes the collection and laboratory analysis of 8 groundwater samples, 5 surface water samples (if present), and 5 surface soil/sediment samples, as well as the appropriate quality control samples. The sampling activities will be scheduled upon approval of this SAP (tentatively scheduled for mid-August, 2010). Refer to Table 1 in Section 3.1 for a list of specific sample types and types of media to be collected at each sample location.

Samples will be submitted to the EPA Region 7 Laboratory for analysis. Unfiltered groundwater and surface water samples will be analyzed for total metals by SW-846 Method 6010 and total cyanide by SW-846 Method 9010. Soil samples will be also be analyzed for total metals and total cyanide. Table 2 within Section 3.1 provides a summary of the number of samples for each sample type, the sampling method, and the respective laboratory analyses.

Prior to performing the site sampling Booz Allen will contact the appropriate representative for the site via telephone to request access for sampling. Booz Allen will begin making telephone request(s) upon approval of this SAP, but no later than three weeks prior to the anticipated site sampling date. Booz Allen will prepare a Telephone Conversation Record to document access for the sampling has been granted. The Telephone Conversation Record will be provided to the EPA TOCOR no later than 10 days prior to the anticipated site sampling date. If access for sampling is denied, Booz Allen will document the denial on the Telephone Conversation Record and immediately forward the records to the EPA TOCOR so that EPA can secure access to the site. If Booz Allen fails to reach the appropriate site representative after three attempts, the Telephone Conversation Records documenting the failed attempts will be provided to the EPA

TOCOR (no later than two weeks prior to the planned site sampling date) so that EPA can secure access to the site.

Booz Allen will also contact the Iowa Department of Natural Resources Wellhead Protection Section, Geological Survey and Resource Assessment Division prior to performing the sampling to identify all groundwater wells within a one-mile radius of the facility. Supply wells, owners, and owner contact information will be provided to the EPA TOCOR in the Sampling Visit Report.

Within 15 days after receipt of the analytical results from the EPA Region 7 Laboratory, Booz Allen will prepare and submit a Sampling Visit Report. Per the April 9, 2010 Task Order Proposal (TOP), the Sampling Visit Report will include:

- A narrative discussion of the field activities conducted
- A narrative discussion of any deviations from the QAPP or SAP, including a discussion of any potential impacts to data usability
- A narrative discussion and tabular presentation of sample information (number, type, date/time, analysis requested)
- Map depicting sample locations
- Tabular presentation of analytical results
- Comparison of analytical results to EPA RSLs
- Tabular presentation of the well survey information received from the IDNR and depth-to-groundwater information obtained in the field
- Summary of the investigation and narrative discussion of recommendations based on the data obtained (i.e., further investigation needed, remediation needed, no further action)
- Photographic log with detailed descriptions
- Copies of all field logbooks pages and forms applicable to the site activities (e.g., field forms, chains of custody)

2.7 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

Specific analyses by sampling location and media are presented in Table 1 within Section 3.1. The analytical methods to be used for each analyte are listed in Table 5 within Section 3.2.2.1, in Table 6 within Section 3.2.3.4, and in Table 7 within Section 3.2.6. The accuracy and precision goals, and the reporting limit targets for this project are provided in Appendix A for each analysis by sample type.

A completeness goal of 90% is set for this sampling visit. Failure to meet this completeness goal is an indicator that data gaps may exist, and that the data set may be insufficient to support project objectives. The completeness will be calculated and presented in the Sampling Visit report, along with a detailed discussion of any data gaps that may remain at the site.

Field duplicate samples will be collected at a frequency of ten percent (one duplicate for every ten or less samples collected) for each type of media sampled. One extra volume for a matrix spike/matrix spike duplicate (MS/MSD) will be collected at a frequency of five percent (one duplicate for every twenty or less samples collected) for each type of media sampled. An

equipment rinsate blank will also be collected at a frequency of five percent (one equipment rinsate blank for every 20 or less samples collected) for each type of equipment that is decontaminated in the field.

Results from the field duplicate samples will be reviewed to evaluate the level of precision, accuracy, and reporting limits associated with the sampling system in accordance with the RCRA Site Sampling Visits in Iowa QAPP. However, it should be noted that poor precision may be unavoidable if the sample matrix is found to be especially heterogeneous. To the extent practical, field duplicates will be coded and labeled such that EPA data verification staff can readily identify the duplicate but the laboratories cannot. The resulting data from the MS/MSDs will be evaluated to assess the precision and accuracy of the sampling and analysis system for this effort, and the resulting data from the equipment rinsate blanks will be evaluated to verify the effectiveness of the decontamination process.

2.8 SPECIAL TRAINING/CERTIFICATION

Personnel will be trained and certified as prescribed in the QMP. As appropriate to their responsibilities, project personnel will be proficient in relevant aspects of sample collection; shipping, handling, and analysis; data reporting and management; and the related QC requirements and practices. The technical staff will be provided with and required to read this site-specific SAP, the site-specific Health and Safety Plan (HASP), the RCRA Site Sampling Visits in Iowa QAPP, the QMP, and all applicable SOPs. Each member of the technical staff must demonstrate proficiency with their assigned duties to include the preparation of associated documentation. Technical SOPs are provided in Appendix B of this SAP. The site-specific HASP is provided in Appendix C of this SAP.

All field sampling personnel will be certified and current in the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training (40-hour initial training and 8-hour annual refreshers), and be enrolled in an annual medical monitoring program.

2.9 DOCUMENTS AND RECORDS

Project documents and records will be prepared or generated, reviewed, approved, and controlled as prescribed in the QMP, in accordance with EPA direction, and as described below.

2.9.1 Field Notebooks

Field notes for sampling and measurement activities will be recorded as described in the RCRA Site Sampling Visits in Iowa QAPP. Specifically, notes will be recorded using indelible black or blue ink in permanently-bound notebooks with numbered pages. The person recording the notes will sign and date the bottom of every page in the field notebook. Changes will be crossed out with a single line so that the original text remains legible, and the change will be initialed and dated. Unused portions of logbook pages will be crossed out, signed, and dated by the recording individual at the end of each workday.

The field notebooks will be used to record the following types of information:

- Description of activity
- Location of activity
- Date and time
- Personnel performing the activity
- Type of personal protective equipment (PPE) used
- Weather conditions (e.g., temperature, precipitation, wind direction, relative humidity, barometric pressure)
- The numerical value and units of each measurement
- The identity and calibration results for each item of field equipment used
- Sample type and sample collection method
- The unique sample number
- The depth(s) from which the sample was collected
- Description of the sample (e.g., color, odor, clarity)
- Identification of conditions that might affect the representativeness of the sample.
- Global positioning system (GPS) coordinates for each sampling locations
- A site sketch showing sampling locations

Field notebooks will be labeled with the contract name, the name of the individual to whom the notebook has been assigned, and sequential notebook number. Individual logbooks dedicated to each site will not be used. Instead, field notes for all 15 sites included in this TO will be recorded in a single set of TO-specific field notebooks.

2.9.2 Field Forms

Additional information may be recorded on separate field forms and referenced in the field notebook. The forms, as well as instructions and responsibilities for completing and archiving each form, are identified in the REPA4 Technical SOPs (included in Appendix B).

2.9.3 Photographs

Photographs will be taken to document field activities according to the procedures described in the RCRA Site Sampling Visits in Iowa QAPP, and a photographic log will be included with the Sampling Visit Report.

2.9.4 Analytical Data Reports

The EPA Region 7 Laboratory will provide an analytical report to the EPA TOCOR, consisting of the results and descriptions of any problems encountered. The EPA TOCOR will forward the analytical report to the Booz Allen TOM for incorporation into the Sampling Visit Report.

3. GROUP B ELEMENTS: DATA GENERATION AND ACQUISITION

This section provides requirements and procedures for sampling design and methodology, sample handling and custody, analytical methodology and acceptance criteria, equipment and material control, and data management.

3.1 SAMPLING DESIGN

The sampling design for this site includes the collection of 18 normal samples and 8 QC samples. These 26 samples to be collected in the field include the following:

- Eight groundwater samples from direct-push boreholes advanced at the site
- One duplicate groundwater sample (QC)
- One MS/MSD groundwater sample (QC)
- One equipment rinsate blank sample (groundwater sampling equipment) (QC)
- 5 surface soil/sediment samples
- One duplicate soil/sediment sample (QC)
- One MS/MSD soil/sediment sample (QC)
- One equipment rinsate blank sample (soil/sediment sampling equipment) (QC)
- 5 surface water samples
- One duplicate surface water sample (QC)
- One MS/MSD surface water sample (QC)

An accounting of the normal sample locations and laboratory analytes is provided in Table 1. A map of sampling locations is provided in Appendix D.

Table 1. Sample Locations, Sample Matrices, and Laboratory Analyses

Location	Aqueous	Analyses	Soil	Analysis
001	Surface Water	Total metals, total cyanide	Surface soil/sediment (0-1 foot bgs)	Total metals, total cyanide
002	Surface Water	Total metals, total cyanide	Surface soil/sediment (0-1 foot bgs)	Total metals, total cyanide
003	Surface Water	Total metals, total cyanide	Surface soil/sediment (0-1 foot bgs)	Total metals, total cyanide
004	Surface Water	Total metals, total cyanide	Surface soil/sediment (0-1 foot bgs)	Total metals, total cyanide
005	Surface Water	Total metals, total cyanide	Surface soil/sediment (0-1 foot bgs)	Total metals, total cyanide
006	Groundwater	Total metals, total cyanide	--	--
007	Groundwater	Total metals, total cyanide	--	--
008	Groundwater	Total metals, total cyanide	--	--
009	Groundwater	Total metals, total cyanide	--	--

Location	Aqueous	Analyses	Soil	Analysis
010	Groundwater	Total metals, total cyanide	--	--
011	Groundwater	Total metals, total cyanide	--	--
012	Groundwater	Total metals, total cyanide	--	--
013	Groundwater	Total metals, total cyanide	--	--

bgs = below ground surface

Samples will be submitted to the EPA Region 7 Laboratory for analysis. Table 2 presents the required analyses for each sample type.

Table 2. Sample Types, Number of Samples, Sampling Methods, and Laboratory Analyses

Sample Type	Number of Samples	Sampling Method	Analyses
Groundwater	8	Discrete, grab	SW-846 6010 SW-846 9010
Duplicate Groundwater	1	Discrete, grab	SW-846 6010 SW-846 9010
MS/MSD Groundwater	1	Discrete, grab	SW-846 6010 SW-846 9010
Equipment Rinsate Blank for Groundwater	1	Discrete, grab	SW-846 6010 SW-846 9010
Surface Water	5	Discrete, grab	SW-846 6010 SW-846 9010
Duplicate Surface Water	1	Discrete, grab	SW-846 6010 SW-846 9010
MS/MSD Surface Water	1	Discrete, grab	SW-846 6010 SW-846 9010
Surface Soil/Sediment	5	Discrete interval	SW-846 6010 SW-846 9010
Duplicate Surface Soil/Sediment	1	Discrete interval	SW-846 6010 SW-846 9010
MS/MSD Surface Soil/Sediment	1	Discrete interval	SW-846 6010 SW-846 9010
Equipment Rinsate Blank for Surface Soil/Sediment	1	Discrete, grab	SW-846 6010 SW-846 9010

Table 3 lists the applicable Booz Allen Technical SOPs approved for use during environmental sampling and related activities performed under REPA4 task orders. Full SOPs for these activities (as listed in Table 3) are included in Appendix B.

Table 3. Booz Allen Technical SOPs

DCN	TITLE
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DCN	TITLE
T-1	Field Measurement & Test Equipment
T-2	IDW Management
T-3	Equipment Decontamination
T-9	Groundwater Sampling
T-12	Soil Sampling
T-17	Sample Management
M-8	Readiness Review
M-13	Field Documentation

Table 4 lists the applicable EPA Field Sampling SOPs that will be followed during the site sampling activities. Full SOPs for these activities (as listed in Table 4) are also included in Appendix B.

Table 4. EPA Field Sampling SOPs

No.	TITLE
4230.07A	Geoprobe Operation
4230.15A	Groundwater Sample Collection
4231.2006	Sampling Equipment Decontamination
4231.2012	Soil Sampling

3.2 SAMPLING METHODS

Booz Allen and/or subcontractor (Terranext) personnel will perform the sampling activities. All field activities will be performed by or under the direction of the Booz Allen TOM. Unless specified in this section, all sampling will be performed as described in the REPA4 QMP, RCRA Site Sampling Visits in Iowa QAPP, Booz Allen Technical SOPs, and EPA Field Sampling SOPs. Sample container and preservative requirements are listed in Table 3-2 of the RCRA Site Sampling Visits in Iowa QAPP.

3.2.1 Drilling Operations

Subsurface advancement at this site will consist of direct-push methodologies, using a Geoprobe 5400 direct-push rig. A geologist or engineer will supervise all subsurface advancement with the Geoprobe rig. This individual will be responsible for on-site monitoring of advancement and sampling operations, and for recording pertinent information (e.g., the geologic materials penetrated, evidence of contamination, and depth to groundwater).

3.2.1.1 Utility Clearance

At least two weeks prior to the site sampling date, Booz Allen will contact Iowa One Call to arrange for an on-site meeting with utility clearance crews. Subsurface utility marking will be scheduled on the morning of the site sampling date. Additionally, Booz Allen will request that the site representative meet with the site sampling crew and/or provide as-built plans or other documentation of any private utilities onsite. Based on the Iowa One Call utility markings and information provided by the site representative, Booz Allen will use professional judgment to determine whether underground utilities are reasonably expected to not be present at the subsurface sampling locations.

If an underground utility is present or suspected to be present near a subsurface sampling location, Booz Allen will immediately contact the EPA TOCOR to discuss an alternate sampling location. If Booz Allen is unable to reasonably determine the presence or absence of underground utilities, Booz Allen will immediately contact the EPA TOCOR to discuss the situation. No subsurface boring or sampling will occur in areas where the locations of underground utilities are unknown.

3.2.1.2 Borehole Advancement

Once underground utilities have been identified and Booz Allen has made the determination that subsurface sampling can proceed, the sampling locations will be measured and flagged on the ground. At the eight subsurface sampling locations, a Geoprobe 5400 direct-push rig equipped with a Macro-Core soil sampler (2-inch diameter, 4-foot length) or a hand auger will be used to advance the borehole. Geoprobe soil cores will be examined (and described in the field logbook) immediately after removal from the borehole. Borehole advancement will cease upon encountering groundwater. If groundwater is not encountered by 30 feet bgs, borehole advancement will cease.

3.2.2 Soil Sampling

Unless otherwise described below, soil and sediment samples will be collected as prescribed in REPA SOP T-12: *Soil Sampling Procedures*. All non-disposable equipment used for soil sampling (e.g., stainless steel spoons and bowls) will be decontaminated prior to each use per Section 3.2.8 of this SAP.

3.2.2.1 Sample Collection

Surface soil/sediment samples will be collected as discrete samples (i.e., from a specific horizontal location and vertical interval) from a depth of 0 to 1 feet bgs (after the removal of the grass/roots/gravel layer). At each sampling location, surface soil/sediment samples will be collected using a hand-operated coring device or stainless steel spoon. The sample will be transferred to a stainless steel bowl and homogenized with a stainless steel spoon prior to placement into the appropriate sample containers. Homogenization will be accomplished by the cone and quartering procedure described in REPA4 SOP T-12: *Soil Sampling*. All sample containers will be filled to the top with measures taken to prevent soil from remaining in the lid

threads prior to being sealed (to prevent potential contaminant migration to or from the samples). After sample containers are filled, they will be immediately sealed, chilled, and processed for shipment to the laboratory.

The EPA Region 7 Laboratory's requirements for sample preservation, sample volume, and holding times are listed in Table 5 below.

Table 5. Soil Sample Preservation, Containers, and Holding Times

NAME	ANALYTICAL METHOD	CONTAINER	PRESERVATION	MINIMUM SAMPLE VOLUME OR WEIGHT	MAXIMUM HOLDING TIME
Metals	SW-846 Method 6010	Glass	$4 \pm 2^{\circ}\text{C}$	8 oz	180 days
Cyanide	SW-846 Method 9010	Glass	$4 \pm 2^{\circ}\text{C}$	8 oz	28 days

3.2.3 Groundwater Sampling

Subsurface groundwater samples will be collected as discrete, grab samples from the Geoprobe borehole using a screen point sampler. The sample will be pumped, using a peristaltic pump and new, dedicated tubing, directly into the appropriate sample containers. Prior to collecting the sample, at least one gallon of water will be pumped as a purge volume.

3.2.3.1 Well Development

No groundwater wells will be installed at this site. As such, this section is not applicable.

3.2.3.2 Water Level Measurements

A small-diameter water level probe will be lowered into the screen point sampler prior to groundwater sample collection to measure the depth to groundwater. The depth to groundwater will be measured to the nearest 0.01 feet and recorded in the field logbook. The water level probe will be decontaminated before each use per Section 3.2.8 of this SAP.

3.2.3.3 Purging Requirements

All groundwater samples will be collected as grab samples from a Geoprobe screen point sampler. As such, traditional purging will not be performed. Prior to sample collection, at least one gallon will be purged from the peristaltic pump sampling setup. Groundwater parameters such as turbidity, pH, oxidation-reduction potential, conductance, and temperature will be measured through a flow-through cell during purging and immediately prior to sample collection.

3.2.3.4 Groundwater Sample Collection

After measuring the water level and purging at least one gallon, groundwater samples will be collected following the procedures described in REPA4 SOP T-9: *Groundwater Sampling Procedures*. To minimize the potential for cross-contamination, fractions will be collected and containerized in the following order of volatilization sensitivity of the analytes of interest:

- Cyanide
- Metals

The EPA Region 7 Laboratory's sample container, preservation, and holding time requirements for groundwater samples are listed in Table 6.

Table 6. Groundwater Sample Preservation, Containers, and Holding Times

NAME	ANALYTICAL METHOD	CONTAINER	PRESERVATION	MINIMUM SAMPLE VOLUME OR WEIGHT	MAXIMUM HOLDING TIME
Metals	SW-846 Method 6010	Glass	$4 \pm 2^{\circ}\text{C}$	1 X 250 mL	180 days
Cyanide	SW-846 Method 9010	Glass	NaOH	1 L	14 days

3.2.4 Surface Water Sampling

Surface water sampling will be performed as prescribed in REPA SOP T-10: *Surface Water Sampling Procedures*. Sampling will be performed at downstream locations first. The sample will be collected by submerging the sample container into the water, with the mouth of the sample container pointed upstream. The sample will be collected upstream from the sampler, and care will be taken to avoid unnecessary disturbance of the substrate. If pre-preserved sample containers are to be used, a new unpreserved sample container will be used to collect the surface water sample and transfer it into the preserved sample container. Surface water samples will be collected before surface soil/sediment samples. Sample container, preservation, and holding time requirements are the same as for groundwater samples (see Table 6 above).

Surface soil/sediment samples will be collected with a stainless steel spoon and transferred into a stainless steel bowl for homogenization. After homogenization and removal of debris, sediment samples will be placed into sample containers. Surface soil/sediment will be collected from the 0-1 foot bgs interval. If the site conditions at the pre-selected sampling location are not conducive for sediment collection (e.g., no stream access, little soil/sediment available for sampling), an alternate location will be selected and documented in the field notebooks.

3.2.5 Waste and Debris Sampling

Waste and debris sampling will not be performed at this site. As such, this section is not applicable.

3.2.6 Field QC Samples

QC samples will be collected as prescribed in the RCRA Site Sampling Visits in Iowa QAPP to ensure sample results are representative of actual field conditions. One duplicate field sample will be collected for every 10 samples per matrix, and one extra volume for MS/MSD will be collected for every 20 field samples per matrix. For each type of equipment that is decontaminated in the field, one equipment rinsate blank will be collected for every 20 samples.

Based on the number of samples to be collected, the following field QC samples will be collected at this site:

- Three duplicate samples (one groundwater, one surface soil/sediment, one surface water)
- Three MS/MSD samples (one groundwater, one surface soil/sediment, one surface water)
- Two equipment rinsate blank samples (one for groundwater sampling equipment, one for surface soil/sediment sampling equipment)

A temperature blank will be also prepared for each sample shipment cooler, per Section 3.2.6.4 of the RCRA Site Sampling Visits in Iowa QAPP, to allow laboratory personnel to verify the sample temperatures upon receipt. As no VOC samples are anticipated at this site, a set of trip blanks will not be prepared.

EPA personnel will be responsible for reviewing the results of QC samples and assessing the impact on the associated project samples. The EPA Region 7 Laboratory's sample container, preservation, and holding time requirements for aqueous QC samples (i.e., equipment rinsate blanks) are listed in Table 7. Sample containers will be pre-preserved by the laboratory.

Table 7. Aqueous QC Sample Preservation, Containers, and Holding Times

NAME	ANALYTICAL METHOD	CONTAINER	PRESERVATION	MINIMUM SAMPLE VOLUME OR WEIGHT	MAXIMUM HOLDING TIME
Metals	SW-846 Method 6010	Glass	$4 \pm 2^{\circ}\text{C}$	1 X 250 mL	180 days
Cyanide	SW-846 Method 9010	Glass	NaOH	1 L	14 days

3.2.7 Additional Sampling Requirements

The HASP (Appendix C of this SAP) addresses the air monitoring and any other monitoring that will be performed to detect potentially unsafe conditions during the field activities. No monitoring or additional sampling requirements are applicable at this site.

3.2.8 Equipment Decontamination

Decontamination of sampling equipment will be conducted prior to and after each sampling location as prescribed in REPA4 SOP T-3: *Equipment Decontamination* to assure the quality of samples collected. Disposable equipment intended for one time use will not be decontaminated but will be packaged for appropriate disposal. Additionally, all equipment that will be reused (e.g., augers, stainless steel spoons and bowls) will be decontaminated prior to each use (including between sample intervals at the same location) and if it comes in contact with any potentially-contaminated media.

Equipment will be decontaminated in a pre-designated area on plastic sheeting, and clean bulky equipment will be stored on plastic sheeting in uncontaminated areas. Cleaned small equipment will be stored in plastic bags. Materials to be stored for more than a few hours will also be covered.

3.2.9 Well/Boring Abandonment

All soil boreholes advanced with the direct-push rig will be abandoned as prescribed in REPA SOP T-5: *Monitoring Well Installation* and in accordance with state and local requirements. For this site, the boring will be grouted from total depth to within three to four feet of ground surface using solid bentonite. Cuttings from the borings will be used to finish abandonment. Ground surface will be restored to its original condition.

3.2.10 Surveying

No surveying by a licensed land surveyor will be performed under this TO. However, per the PWS and TOP, the location of each sample at this site will be recorded using a portable Geographical Positioning System (GPS) unit accurate to ± 10 feet. All readings will be recorded in the field logbook and presented in the Sampling Visit Report.

3.2.11 IDW Management

Per the PWS and TOP, soil cuttings and decontamination fluids investigation-derived waste (IDW) will remain onsite. Soil cuttings will be placed back in the ground. Groundwater pumped from the boreholes prior to sampling will be allowed to percolate back into the ground at the location of the former treatment pond. Booz Allen will containerize and remove IDW such as used personal protective equipment (PPE) and used sampling supplies for proper offsite disposal.

3.3 SAMPLE HANDLING AND CUSTODY

This section summarizes sample identification, handling, management, documentation, document control, custody, and scheduling requirements. For samples under REPA4 control, the chain-of-custody and sample storage requirements of SW-846 will be followed. Custody procedures will be implemented such that accurate and complete records of sample collection,

transfer of samples between personnel, sample shipment, and receipt by the laboratory are generated and retained.

The locations sampled, observations, number and type of containers, and requested analyses will be recorded in the field notebook, chain-of-custody form, and Sampling Report. These QA/QC records will be managed and retained as prescribed in the REPA4 QMP.

At each location, samples designated for a particular analysis will be filled sequentially before bottles designated for the next analysis are filled. If a duplicate sample is to be collected, all sample bottles designated for a particular analysis for both sample designations will be filled sequentially before bottles for another analysis are filled.

Per the PWS, Booz Allen will inform the site representative of his/her right to collect split samples during the site sampling activity. It is assumed that no split samples will be requested at this site. However, if split samples are requested, Booz Allen will:

- Collect split samples for the site representative in sample containers provided by the representative (i.e., Booz Allen will not provide sample containers to the site representative)
- Note the type and condition of the sample containers provided for split samples in the field logbook
- Note sample handling, preservation, and any other procedures/observations that may affect the integrity of the split sample analytical results
- For groundwater samples, Booz Allen will fill EPA sample containers first, and then fill site-supplied containers.
- For soil samples, Booz Allen will homogenize a large enough aliquot of soil to adequately fill EPA and site-supplied containers from the same homogenized sample.

3.3.1 Sample Identification

The Booz Allen field team lead will assign and issue a unique sample identification number for each sample collected under his/her purview. The sample identification numbering system for new locations will consist of the initials of the site, a unique and sequential sample number, a two-letter matrix code, and the location code. Once assigned, the sample number will be included on the sample label and referenced on the chain-of-custody form, the field logbook, and all data reports related to the sample.

For example:

- CW-01-SD-001 is assigned to the first sediment sample collected for C.W. Process at sample location 001
- CW-01-GW-006 is assigned to the first groundwater sample collected for C.W. Process at sample location 006
- CW-02-GW-006 is assigned to a second, duplicate groundwater collected for C.W. Process at sample location 006

A label will be affixed on each sample bottle before sample collection. Information on the sampling labels will include the sample identification number, sampler's name or initials, chemical/physical preservative used, analysis requested, date/time collected, and type of sample.

3.3.2 Sample Delivery

At Booz Allen, the primary point of contact (POC) for sample delivery will be the field team lead and TOM, John Dixon. Mr. Dixon will also have primary responsibility for sample labeling and identification.

Nicole Roblez of EPA will be the POC for the EPA Region 7 Laboratory. Ms. Roblez may be reached at 913-551-5130. All planning, sample delivery, and other laboratory communication will be coordinated through Ms. Roblez.

3.3.3 Schedule

The Booz Allen TOM will coordinate the scheduling of sample collection with the EPA Region 7 Laboratory so as to minimize sample transport and holding time. Unless otherwise approved by the EPA Region 7 Laboratory, environmental samples will be packaged and shipped to the laboratory overnight (for morning delivery) at the completion of the day's sampling activities.

3.3.4 Sample Custody

Booz Allen will ensure the integrity and security of all samples under REPA4 control using a stringent chain-of-custody protocol comparable to the chain-of-custody protocol specified in the CLP program. Immediately following collection, samples will be placed on ice in a cooler and will remain refrigerated until prepared for shipment to the laboratory. Strict chain-of-custody procedures will be followed and the samples will be shipped to the laboratory via Federal Express or hand-delivered to the EPA Region 7 Laboratory.

Chain-of-custody, which begins with sample collection and terminates upon sample disposal, will be documented throughout the life-cycle of each sample. A chain-of-custody form will be initiated during sample collection and will remain with the samples until receipt in the laboratory. The chain-of-custody record will include the sample numbers, date and time of collection, sampling location, name of the person who collected the samples, preservatives used, and the analyses requested. Each sample transfer will then be documented on the chain-of-custody form. Copies of completed air bills (if shipped via Federal Express) will be included as part of the final custody documentation.

At the time that samples are relinquished to a commercial carrier, the person responsible for shipping the samples will perform the following activities:

- Remove all labels from the outside of the cooler
- Sign the chain-of-custody form under "Relinquished By," enter the name of the carrier organization under "Received By," and document the date and time of transfer

- Enclose the sheet in a waterproof plastic bag and tape it to the underside of the lid of the sample cooler
- Secure the cooler with strapping tape and custody seals in such a manner that the cooler cannot be opened without disturbing the seals
- Photograph the sealed cooler (if camera is available) and record all the requisite information in the field logbook

At the time that custody is transferred from the carrier to the EPA Region 7 Laboratory, the laboratory's sample custodian will perform the following activities:

- Indicate the carrier organization on the chain-of-custody form under "Relinquished By"
- Sign off under "Received By" and document the date and time of transfer

If samples are hand-delivered to the EPA Region 7 Laboratory, a similar procedure will be used to transfer the samples to the laboratory's sample custodian. Samples will be hand-delivered if carrier delivery cannot get the samples to the EPA Region 7 Laboratory by 1200 on Friday.

Under no circumstance should there be a break in custody.

Upon receipt of samples by the analytical laboratory, the sample custodian will sign and date the "received by" portion of the chain-of-custody form. The sample custodian will also check the temperature of each ice chest and record this information on the chain-of-custody form and internal traffic log. The pH of those samples intended for inorganic analyses will be checked and recorded after scanning for radioactivity. If an ice chest is found to be warmer than 6°C, the Booz Allen TOM and field team lead will be notified. In the laboratory, the necessary documentation will be prepared and distributed to all involved analysts, and the samples will be stored in appropriate refrigerators. Access to the samples will be obtained through the sample custodian.

The laboratories' sample management and analytical documentation procedures will satisfy EPA requirements. All samples will be handled under strict chain-of-custody protocol, and in the laboratory, samples and extracts will be tracked and accounted for at all points during processing. The original sample analysis data will be captured in a permanent form, along with the appropriate documentation to support its quality. A sufficient level of redundancy will exist so that all information can be verified from multiple sources.

3.3.5 Sample Containers and Coolers

Sample containers and coolers will be inspected before each use. Sample containers will be selected, prepared, cleaned, and controlled per EPA Office of Solid Waste and Emergency Response (OSWER) Directive #9240.0-05A *Specifications and Guidance for Contaminant-Free Sample Containers* (EPA 540/R-93/051, December 1992). A complete set of sample containers will be prepared by the EPA Region 7 Laboratory and picked up by the Booz Allen TOM in advance of each sampling event (unless otherwise stated by the laboratory during planning phases). Extra containers will be readily available to field staff as contingency for damaged or

potentially contaminated containers and for use with samples of opportunity. Sample containers will be kept away from fuels and solvents.

Project requirements will also include the following:

- EPA Region 7 Laboratory will provide sample bottles and coolers prior to initiation of field activities and based on notification from the Booz Allen TOM
- The coolers will be cleaned and decontaminated with distilled water prior to use
- Coolers will be sealed with custody seals before shipment to the sampling site. The seals must be affixed in such a manner that the cooler cannot be opened without breaking the seals
- Bottles will be certified clean in writing on a per-shipment basis
- EPA Region 7 Laboratory will supply bottles that are pre-preserved, if applicable and available. EPA Region 7 Laboratory will provide all necessary preservatives if field preservation is required
- Records concerning the cleaning of sample containers and security of empty containers at the site will be retained by the EPA Region 7 Laboratory

3.3.6 Sample Disposition

The EPA Region 7 Laboratory will be responsible for the proper disposal of all samples and extracts.

3.3.7 Shipping

At the completion of all sampling activities, samples collected will be packaged and shipped as prescribed in REPA4 SOP T-17: *Sample Management*. Samples will be shipped using Federal Express priority overnight service. The field team lead will contact the designated laboratory POC and provide shipping information to include the carrier name and tracking number, the number of coolers being sent, and whether or not these samples are the last ones for the project.

Sample coolers will contain sufficient ice to maintain required temperature preservation of samples. The chain-of-custody form and analysis request forms will be placed inside a watertight plastic bag taped to the inside of the cooler lid.

For samples that are hand-delivered to the EPA Region 7 Laboratory, the sample coolers will be similarly-prepared.

3.4 ANALYTICAL METHODS

This section provides routine analytical requirements and procedures that will be implemented for this sampling program.

3.4.1 Analytical Procedures

The analytical procedures to be used in this sampling program are listed within Section 3.2 in Tables 5, 6, and 7. Sample preparatory methods applicable to these procedures can be found in the RCRA Site Sampling Visits in Iowa QAPP, Table 3-3.

3.4.2 Calibration Procedures

Calibration procedures are specified in each of the analytical methods. All analytes reported will be present in the initial and continuing calibrations. Reported results will fall within the calibration range. Records of standard preparation and instrument calibration will be maintained. Records will unambiguously trace the preparation of standards and their use in calibration and quantification of sample results. Calibration standards will be traceable to standard materials. Traceability to the National Institute of Standards and Technology (NIST) and EPA standards will be maintained to the maximum extent possible, but the source of calibration will be documented in all cases.

3.4.3 Standards Preparation and Traceability

Traceability of standards will be accomplished by comparing in-house standards to EPA or NIST materials, and by maintaining the required records. Whenever a standard is prepared, the manufacturer's lot number, the starting materials, the starting amount and volume, the source and volume of the solvent or acid, the date of preparation, and the initials of the technician will be recorded in a permanent, bound notebook. The accuracy of the standards will be established by comparison to previously prepared standards and by comparison to standards prepared independently from different starting materials.

3.4.4 Preparation of Spiked Samples

The laboratories will document the method used to prepare spiked samples, and the solutions used in sample preparation must be NIST traceable and current, to the maximum extent possible. For some target compounds, however, traceability to NIST may not be possible, and traceability to EPA standards or other nationally recognized standards will be used instead. In such cases, the laboratory POC will consult with the Booz Allen PQAM before preparing the spiked samples.

3.5 QUALITY CONTROL

Laboratory QC samples (e.g., blanks and laboratory control samples) will be included in the preparation batch with the field samples. An analytical batch is a number of samples (not to exceed 20 environmental samples plus the associated laboratory QC samples) that are similar in composition (matrix) and that are extracted or digested at the same time and with the same lot of reagents. MSs and MSDs count as environmental samples. The term analytical batch also extends to cover samples that do not need separate extraction or digestion (e.g., volatile analyses by purge and trap). The identity of each analytical batch will be unambiguously reported with

the analyses so that a reviewer can identify the QC samples and the associated environmental samples.

3.6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

Field and laboratory equipment will be appropriate and approved for intended uses. The procurement and handling of quality-affecting equipment will be controlled to ensure initial and continued conformance with applicable technical requirements and acceptance criteria. Quality-affecting materials that are to be controlled include, but are not limited to, field and laboratory measurement and testing equipment (M&TE) and sampling equipment.

3.6.1 Equipment Use and Management

Equipment will be selected so as to ensure that it is of the proper type, size, tolerances, and sensitivity range to support its intended use. REPA4 SOP T-1: *Field M&TE* provides calibration, maintenance, and operation instructions for routine field M&TE.

Equipment used in the execution of work will be appropriate and approved for its intended use, and it will be operated, handled, maintained, and stored in accordance with the manufacturer's specifications. Sample collection and storage equipment will be cleaned, stored, and handled using the necessary precautions against cross-contamination, corrosion, and damage. Table 8 provides restrictions for field equipment selection and use.

Table 8. Field Equipment Selection and Use

EQUIPMENT	USE	RESTRICTIONS
Gloves, safety shoes, first aid kit	Personal protective equipment	Compatible with site conditions and investigations
Sample containers	Contain samples	Compatible with analyses of concern
Sample shipment containers	Contain sample containers for transport from field to laboratory	Capable of maintaining internal ambient temperature of $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$
Bubble wrap, packing material, polyethylene bags	Sample storage in shipping container	Compatible with sample containers
Buckets	Washing, miscellaneous	None
Large polyethylene bags	Waste storage	Properly disposed
Sample cables, custody seals, chain-of-custody forms, logbooks, waterproof pens	Sample documentation	Use indelible ink; corrections made in accordance with SOPs; initialed, dated
Geoprobe rod	Sample collection	Decontaminate prior to and between sampling locations, and between intervals at the same location
Peristaltic pump	Groundwater sample collection	Groundwater sampled via screen point sampler
Disposable towels, deionized water,alconox, trash bags	Clean sampling equipment	Properly disposed
PID	Detect organic vapors	Properly calibrated
Water quality meter	Measure water quality parameters	N/A
Turbidity meter	Measure water turbidity	N/A
GPS	Measure coordinates of sampling points	Properly programmed

3.6.2 Inspection and Testing

M&TE will be calibrated and maintained according to the manufacturer's recommendations and as prescribed in REPA4 SOP T-1: *Field M&TE*. Field equipment will be visually inspected before shipment to the field (or pickup from supplier) and again before use. Sample collection and storage equipment will be cleaned, stored, and handled using the necessary precautions against cross-contamination, corrosion, and damage. Equipment, parts, or components that do not meet specifications (i.e., nonconforming items) will be identified in a manner that is easily recognized. These items will be controlled so as to prevent their inadvertent use or installation.

3.6.3 Preventive and Remedial Maintenance

Field and laboratory equipment will be maintained on routine preventive maintenance schedules. Preventive and remedial maintenance will be performed and verified by qualified personnel and in accordance with approved procedures and manufacturer's recommendations. Maintenance records will be generated, retained, and reviewed as part of the project quality records.

Maintenance activities will be documented in instrument-specific or field logbooks. Entries should include the following information:

- Equipment identification (e.g., type, model, serial number, and manufacturer)
- Procedure reference
- Date, description, and results of calibration/maintenance

- Name and affiliation of the person who performed maintenance

Instrument maintenance logbooks and records, field SOPs, field logbooks, and field records are QA/QC records and subject to relevant requirements as established in the REPA4 QMP.

3.6.4 Storage and Disposal

Project personnel will ensure the secure and appropriate storage and/or disposal of project equipment and materials under their responsibility. Where needed for generators, gasoline will be transported in a different vehicle from sample collection equipment and sample containers, stored and handled away from the sampling activities, and handled by an individual not involved in sample collection. Refer to the RCRA Site Sampling Visits in Iowa QAPP for storage requirements and restrictions applicable at this site.

3.7 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

Booz Allen anticipates using a PID in the field. This equipment will be calibrated by Field Environmental (the supplier and owner of the equipment), prior to field mobilization and, if necessary, by Booz Allen staff in the field according to manufacturer's instructions.

3.8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Materials used in the execution of work will be appropriate and approved for intended uses. The procurement and handling of quality-affecting materials will be controlled to ensure initial and continued conformance with applicable technical requirements and acceptance criteria. These items will be visually inspected before shipment to the field and again before use. Inspection elements will include, as appropriate, a review of physical condition, expiration dates, limitations of use, size and quantity, and quality grade (e.g., reagents and solvents). Quality-affecting materials that are to be controlled include, but are not limited to, sample bottles, deionized water, disposable sampling supplies, and disposable PPE. Materials that do not meet performance specifications will be segregated and labeled to preclude use.

3.9 NON-DIRECT MEASUREMENTS

Previous sampling has been performed and reported for this site. Booz Allen cannot attest to the accuracy or usability of the previous soil sampling data. Booz Allen will consider this data to be screening-level data only. The historical analytical data will be summarized in the Sampling Visit report as background information only (i.e., the data will not be presented as definitive analytical data).

3.10 DATA MANAGEMENT

The EPA Region 7 Laboratory will provide data in both electronic (preliminary data only) and hard copy (full data package) format to the EPA TOCOR, who will forward the data to Booz Allen. Booz Allen will not be required to conduct data validation. Data Summary Tables with final data results will be developed for the Sampling Visit report.

4. GROUP C ELEMENTS: ASSESSMENT AND OVERSIGHT

Booz Allen's overall assessment program is described in the REPA4 QMP and the RCRA Site Sampling Visits in Iowa QAPP. Due to the limited nature of the investigation at this site, the majority of these elements are not applicable on a site-specific basis.

Prior to implementation of field activities, internal readiness reviews are conducted by Booz Allen to verify that work prerequisites have been satisfied. The readiness review provides a systematic process for assessing, verifying, and ensuring the readiness of the project team to proceed with field activities. The focus of the readiness review is to ensure that technical and quality procedures have been reviewed for adequacy and appropriateness and approved for implementation; personnel are suitably qualified for the work; and the proper equipment, materials, and resources are identified and available.

5. GROUP D ELEMENTS: DATA VALIDATION AND USABILITY

Booz Allen will review the data to ensure that each data set is complete and that there are no gross deficiencies. Booz Allen will not validate the data. The data will be submitted to EPA as preliminary results. EPA Region 7 will be responsible for data validation activities.

5.1 DATA REVIEW, VALIDATION, AND VERIFICATION

For the purposes of this SAP, data review is defined as the process whereby the technical merit of data is determined by the organization that generates the data. During this process, achieved QC results are compared to method-specified criteria to determine whether the analyses were performed under controlled conditions. Because data review criteria are based on the analytical methods used to generate the data, the review process and results are independent of the intended use of the data. Before submitting data, the EPA Region 7 Laboratory will be responsible for reviewing their data, implementing corrective actions where possible, and reporting nonconformance and the corresponding corrective actions, as applicable. Field crews will review their data and implement any necessary corrective actions before submitting the data for use.

The data will be submitted to EPA in the Sampling Visit Report as final, but unvalidated results. EPA Region 7 will be responsible for performing or procuring data validation, if desired.

5.1.1 Data Flow and Checking

Each analytical protocol that is cited in Section 3.4 of the RCRA Site Sampling Visits in Iowa QAPP provides detailed instructions for calculating analyte concentrations. Section 3.5 of the QAPP describes calculations related to QC requirements.

The EPA Region 7 Laboratory analyst performing the assay will review all results with respect to QC requirements. Compiled results will be further reviewed by at least one other qualified individual at the laboratory, with respect to completeness of the data package and compliance with all contractual and in-house QC requirements. The Booz Allen TOM or his/her designee will provide a final independent review of the completed data package with respect to contract compliance and data usability.

5.1.2 Project-Specific Requirements

Analytical results will be communicated directly from the laboratories to the EPA TOCOR, who will forward the results to Booz Allen. In no case will Booz Allen release reports, results, or data to a third party without prior written permission from the EPA TOCOR. Electronic deliverable data files will be prepared whenever possible by direct electronic transfer from analytical instruments to avoid transcription errors.

5.1.3 Reporting the Results of Analyses

Data provided by the EPA Region 7 Laboratory may be supplied in both electronic and hardcopy media. Both reports will consist essentially of a listing specifying the client ID number, the

internal laboratory ID number, the sample date, the data prepared and/or analyzed, the method, the matrix, the parameter(s) and the measured concentration(s), units, and the detection limit. QC sample results will be reported in similar format with cross-references to unambiguously relate QC results to their associated environmental samples. Laboratory results in hard copy format will follow the guidance found in Section II of the U.S. EPA CLP Statement of Work for Organic (OLM4.1) and Inorganic (ILM04.0) Multi-Media Multi-Concentration.

5.1.4 Case File Maintenance and Record Turnover

The EPA Region 7 Laboratory will maintain requirements for case file maintenance and archiving. The case file will contain the following:

- Internal laboratory chain of custody
- Copy of field crew's sample collection chain of custody
- Logbook records (sample preparation, standard preparation, run sequence logs)
- Copies of final internal (laboratory) raw summary sheets from which data are entered
- Information needed to evaluate results (acceptance limits, control charts, detection limits, retention time windows, percent moisture, corrective actions)
- Instrument printouts, including chromatograms (GC, GC/MS, LC, IC, spectra of raw responses)
- Internal (laboratory) detail documentation supporting internal QA and assessment, precision, and accuracy (replicates, duplicates, matrix spikes, matrix spike duplicates, trip blanks, control samples, calibration checks)

In summary, documentation must be sufficient to recheck and recalculate reported results at a later date if it becomes necessary. Both electronic and hardcopy data reports will be archived according to the schedule prescribed in the RCRA Site Sampling Visits in Iowa QAPP. In all cases, hardcopy printouts will supplement these electronic reports.

5.1.5 Detection Limits and Reporting

The MDL is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. The Reporting Limit (RL) is the lowest concentration at which an analyte can be detected and its concentration reported with a pre-defined degree of precision and accuracy. The EPA Laboratory will report results to the RL, which is higher than the MDL. Results less than or equal to the MDL will be reported as less than the RL value and flagged with a "U." Results less than the RL but higher than the MDL will be reported and flagged as estimated values.

5.1.6 Notification of Lost Samples, Reporting Error, Out-of-Control Samples, or Loss of Capability

Booz Allen will notify the EPA TOCOR of nonconforming conditions that may potentially impact the quality or timeliness of analysis. At the same time, proposed corrective actions will be presented. Nonconforming conditions would include out-of-control results or supporting documentation, inadvertently destroyed or lost samples, or the loss of a laboratory capability that may adversely affect analytical test results.

5.2 VERIFICATION AND VALIDATION METHODS

Data validation will not be performed under this TO. Any data reduction, verification, and archiving performed by Booz Allen will be similar to that required by the EPA Contract Laboratory Program (CLP), with certain modifications as noted below. TO-generated data will be evaluated as outlined in the *CLP National Functional Guidelines for Inorganic* (EPA 540/R-94/013) and *Organic* (EPA 540/R-94/012) *Data Review*, and as appropriate to the methods in the RCRA Site Sampling Visits in Iowa QAPP.

The EPA Region 7 Laboratory will apply the appropriate data qualifiers if acceptance criteria are not met and corrective action is either not successful or not performed. EPA will be responsible for data validation, if desired.

5.3 RECONCILIATION WITH USER REQUIREMENTS

The suitability of environmental data for their intended use(s) will be determined. Data usability involves an evaluation of the quantity, type, and overall quality of generated data against the project objectives. The usability of data that are associated with QC results outside established acceptance criteria is generally dependent on the degree of the exceedance, whether the potential bias is high or low, and whether the uncertainty implied by the exceedance is significant. Usability will be assessed in accordance with the applicable EPA guidance.

APPENDIX A

DATA QUALITY OBJECTIVE CRITERIA

APPENDIX B
TECHNICAL SOPs

APPENDIX C

SITE-SPECIFIC HEALTH AND SAFETY PLAN

APPENDIX D

SITE MAPS INCLUDING SAMPLE LOCATIONS

APPENDIX A. ANALYTICAL QC CRITERIA

Reporting Limits for Method SW6010

PARAMETER/METHOD	ANALYTE	WATER		SOIL	
		RL	UNIT	RL	UNIT
ICP Screen for Metals	Aluminum	0.2	mg/L	22.0	mg/kg
SW6010	Antimony	0.05	mg/L	10.0	mg/kg
	Arsenic	0.03	mg/L	40.0	mg/kg
	Barium	0.005	mg/L	1.0	mg/kg
	Beryllium	0.005	mg/L	1.0	mg/kg
	Cadmium	0.007	mg/L	0.50	mg/kg
	Calcium	1.1	mg/L	100	mg/kg
	Chromium	0.01	mg/L	20	mg/kg
	Cobalt	0.006	mg/L	10.0	mg/kg
	Copper	0.01	mg/L	2.0	mg/kg
	Iron	0.20	mg/L	3.0	mg/kg
	Lead	0.025	mg/L	10.0	mg/kg
	Magnesium	0.10	mg/L	100	mg/kg
	Manganese	0.003	mg/L	2.0	mg/kg
	Molybdenum	0.015	mg/L	3.0	mg/kg
SW6010	Nickel	0.01	mg/L	2.0	mg/kg
(Continued)	Potassium	0.50	mg/L	600	mg/kg
	Selenium	0.03	mg/L	3.0	mg/kg
	Silver	0.01	mg/L	1.0	mg/kg
	Sodium	1.0	mg/L	10.0	mg/kg
	Thallium	0.08	mg/L	6.0	mg/kg
	Vanadium	0.01	mg/L	1.0	mg/kg
	Zinc	0.01	mg/L	1.0	mg/kg

Quality Control Acceptance Criteria for Method SW6010

METHOD	ANALYTE	ACCURACY WATER (% R)	PRECISION WATER (% RPD)	ACCURACY SOIL (% R)	PRECISION SOIL (% RPD)
SW6010	Aluminum	75–125	≤ 20	75–125	≤ 20
	Antimony	75–125	≤ 20	75–125	≤ 20
	Arsenic	75–125	≤ 20	75–125	≤ 20
	Barium	75–125	≤ 20	75–125	≤ 20
	Beryllium	75–125	≤ 20	75–125	≤ 20
	Cadmium	75–125	≤ 20	75–125	≤ 20
	Calcium	75–125	≤ 20	75–125	≤ 20
	Chromium	75–125	≤ 20	75–125	≤ 20
	Cobalt	75–125	≤ 20	75–125	≤ 20
	Copper	75–125	≤ 20	75–125	≤ 20
	Iron	75–125	≤ 20	75–125	≤ 20
	Lead	75–125	≤ 20	75–125	≤ 20
	Magnesium	75–125	≤ 20	75–125	≤ 20
	Manganese	75–125	≤ 20	75–125	≤ 20
	Molybdenum	75–125	≤ 20	75–125	≤ 20
	Nickel	75–125	≤ 20	75–125	≤ 20
	Potassium	75–125	≤ 20	75–125	≤ 20
	Selenium	75–125	≤ 20	75–125	≤ 20
	Silver	75–125	≤ 20	75–125	≤ 20
	Sodium	75–125	≤ 20	75–125	≤ 20

METHOD	ANALYTE	ACCURACY WATER (% R)	PRECISION WATER (% RPD)	ACCURACY SOIL (% R)	PRECISION SOIL (% RPD)
	Thallium	75–125	≤ 20	75–125	≤ 20
	Vanadium	75–125	≤ 20	75–125	≤ 20
	Zinc	75–125	≤ 20	75–125	≤ 20

**Summary of Calibration and Quality Control
Procedures for Method SW6010**

METHOD	APPLICABLE PARAMETER	QC CHECK	MINIMUM FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION
SW6010	ICP Metals	Initial calibration (minimum 1 standard and a blank)	Daily initial calibration prior to sample analysis	N/A	N/A
		Initial calibration verification (second source)	Daily after initial calibration	All analytes within ± 10% of expected value	Correct problem, then repeat initial calibration
SW6010 (Continued)		Calibration blank	After every calibration verification	No analytes detected ≥ RL	Correct problem, then analyze calibration blank and previous 10 samples
		Calibration verification (Instrument Check Standard)	After every 10 samples and at the end of the analysis sequence	All analyte(s) within ± 10% of expected value and RSD of replicate integrations < 5%	Repeat calibration and reanalyze all samples since last successful calibration
		Method blank	One per analytical batch	No analytes detected ≥ RL	Correct problem, then repeat prep and analysis of method blank and all samples processed with the contaminated blank
		Interference check solution (ICS)	At the beginning of an analytical run	Within ± 20% of expected value	Terminate analysis, correct problem, reanalyze ICS, reanalyze all affected samples
		LCS for the analyte	One LCS per analytical batch	QC acceptance criteria, Table A-40	Correct problem, then repeat prep and analysis of LCS and all samples in the affected analytical batch

METHOD	APPLICABLE PARAMETER	QC CHECK	MINIMUM FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION
		Dilution test	Each new sample matrix	1:5 dilution must agree within $\pm 10\%$ of the original determination	Perform post digestion spike addition
		Post digestion spike addition	When dilution test fails	Recovery within 75–125% of expected results	Correct problem, then reanalyze post digestion spike addition
		MS/MSD	One MS/MSD per every 20 project samples per matrix	QC acceptance criteria, Table A-40	None

Reporting Limits for Method SW9010/SW9012

PARAMETER/METHOD	ANALYTE	WATER	
		RL	UNIT
SW9010/SW9012	Total Cyanide	0.02	mg/L

Quality Control Acceptance Criteria for Method SW9010/SW9012

METHOD	ANALYTE	ACCURACY WATER (% R)	PRECISION WATER (% RPD)
SW9010 SW9012	Total Cyanide	79–114	≤ 20

Summary of Calibration and Quality Control Procedures for Method SW9010/SW9012

METHOD	APPLICABLE PARAMETER	QC CHECK	MINIMUM FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION
SW9010/ SW9012	Cyanide	Multipoint calibration curve (6 standards and a calibration blank)	Initial daily calibration prior to sample analysis	Correlation coefficient ≥ 0.995 for linear regression	Correct problem, then repeat initial calibration
		Distilled standards (one high and one low)	Once per multipoint calibration	Cyanide within $\pm 10\%$ of true value	Correct problem, then repeat distilled standards
		Second-source calibration verification	Once per stock standard preparation	Cyanide within $\pm 15\%$ of expected value	Correct problem, then repeat initial calibration
SW9010/ SW9012 (Continued)		Method blank	One per analytical batch	No analytes detected \geq RL	Correct problem, then repeat prep and analysis of method blank and all samples processed with the contaminated

METHOD	APPLICABLE PARAMETER	QC CHECK	MINIMUM FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION
					blank
		LCS for all analytes	One LCS per analytical batch	QC acceptance criteria, Table A-55	Correct problem, then repeat prep and analysis of LCS and all samples in the affected analytical batch
		MS/MSD	One MS/MSD per every 20 project samples per matrix	QC acceptance criteria, Table A-55	None

SITE-SPECIFIC HEALTH AND SAFETY PLAN BOOZ ALLEN HAMILTON

Project Title: RCRA Site Sampling Visit at the C.W. Process Company

Project #: R7031

Site Location: Cedar Rapids, Iowa

Program Manager: Ed Greutert

Project Manager: John Dixon

Site Health and Safety Officer: John Dixon

Program Health and Safety Officer: Christine Capozzi

Signatures

Prepared By: _____ **Date:** _____

Approved By: _____ **Date:** _____

Note: This site-specific health and safety plan (SSHSP) documents the project activities and associated safety and health hazards that on-site personnel may encounter. This SSHSP supplements the Booz Allen Hamilton Health and Safety Program and is intended to be implemented in conjunction with the Health and Safety Program. When additional information regarding safety and health issues is necessary, refer to the Health and Safety Program or contact the Program Health and Safety Officer. Specific safety programs that are referenced further in this SSHSP are all located in the appendices of the Health and Safety Program.

Scope of Work

Site Background: The C.W. Process Company is located approximately three miles southwest of Cedar Rapids, Iowa. The site is located in an area of town containing other properties developed for industrial use, as well as residential areas. The C.W. Process Company historically manufactured hammer handles, but the site currently is not in operation. The EPA files show Wayne Manufacturing began treatment of cyanide wastes at the C.W. Process site in 1956. Around 1995, the facility changed its name to C.W. Process Company, and continued operations for an unknown period of time until operations were terminated sometime prior to 2004.

The EPA conducted Compliance Evaluation Inspections (CEIs) at the Wayne Manufacturing facility in 1986 and 1988. The inspections identified a former treatment pond and various other F006 hazardous waste storage areas. In 1997, C.W. Process submitted Closure Certification for several of the units, the Furnace No. 2 and the Drum Storage Area and for the evaporator dry-down area and drum staging area south of the manufacturing plant.

On July 17, 2004, a Phase II Site Investigation Report reported seven soil samples, one onsite tap water, and three groundwater samples were collected. Cyanide was detected in all soil samples at levels ranging from 2.5 to 296 milligrams per kilogram (mg/kg) (below closure standards and statewide standards). All three groundwater samples identified cyanide concentrations in excess of the statewide standard of 0.2 mg/L. Diesel and motor oil were also shown to exceed statewide standards, but at a much lesser degree. No contaminants were detected in the drinking water sample.

A second Phase II Site Investigation was conducted in 2005. The investigation collected an additional drinking water sample from a neighboring residence, as well as four additional groundwater samples. Cyanide concentrations in three of the groundwater samples exceeded the 0.2 mg/L statewide standard. The source of groundwater contamination was determined to be the former treatment pond (lagoon) which has been covered with soil and historically received treated cyanide wastes.

Work Description: Elevated levels of cyanide have been detected in groundwater samples collected from the C.W. Process site. The cyanide contamination is believed to be associated with the historical use of a wastewater treatment pond receiving cyanide contaminated waste. Additionally, a floor drain in the heat treatment room, which discharged through a septic tank and into a nearby stream, was identified as a potential source of environmental contamination. No surface water, sediment, or soil samples have been taken from the drainage swale leading to the nearby stream or from the stream itself. EPA would now like to determine the extent of cyanide and RCRA metals contamination at the site, and if the contamination has reached the property boundaries. The resulting data will be screened against EPA Regional Screening Levels (RSLs) to determine the extent of contamination and if further investigation or remediation is required at the site.

Booz Allen has contracted with the EPA Region 7 Laboratory located in Kansas City, Kansas, to analyze these environmental samples for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs).

Task 1: One (1) Booz Allen staff and two (2) Terranext staff will travel to Cedar Rapids, Iowa and meet the PSA Environmental Geoprobe operator at a pre-designated location.

Task 2: The EPA TOCOR will coordinate with Booz Allen staff to select the groundwater sampling locations from which the samples are to be collected. Booz Allen staff will collect up to eight (8) groundwater samples. In addition, field duplicates and matrix spike/matrix spike duplicate samples will be collected as appropriate. The groundwater samples will be collected with the assistance of a peristaltic pump through a Geoprobe screen point sampler.

Task 3: The EPA TOCOR will coordinate with Booz Allen staff to select the locations from which surface soil/sediment samples will be collected. Booz Allen staff will collect up to five (5) surface soil/sediment samples. In addition, field duplicates and matrix spike/matrix spike duplicate samples will be collected as appropriate. The surface soil/sediment samples will be collected with the assistance of a hand auger.

Task 4: The EPA TOCOR will coordinate with Booz Allen staff to select the locations from which surface water samples are to be collected. No temporary or permanent monitoring wells are to be installed. Booz Allen staff will collect up to five (5) surface water, as well as, field duplicates and matrix spike/matrix spike duplicate samples.

Task 5: Booz Allen staff will hand deliver, or package and ship via FedEx, the environmental samples to the EPA Region 7 Laboratory located in Kansas City, Kansas.

Note: The task numbering above is specific to this HASP; it does not correspond to the overall Task Order numbering.

Contractors/Subcontractors on-site: Booz Allen, Terranext, PSA Environmental

Project Personnel

List all personnel who will be covered under this SSHSP while working on the project site and identify their level of training and medical monitoring. Add additional rows as necessary

	Training	Medical
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Personnel	A	B	C	D	E	F	G	H	I
John Dixon	X	X	X			X	X	X	X
Meredith Watson	X	X	X			X	X	X	X
Jim Fisher	X	X	X			X	X	X	X
PSA Environmental	X	X	X			X	X	X	X

Training

- A. 40 hour training in accordance with 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response.
- B. Respiratory training in accordance with 29 CFR 1910.134, Respiratory Protection.
- C. Personal Protective Equipment training in accordance with 29 CFR 1910.132, PPE General Requirements.
- D. Permit-Required Confined Space training in accordance with 29 CFR 1910.146, Permit-Required Confined Spaces.
- E. Lockout/Tag out training in accordance with 29 CFR 1910.147, The Control of Hazardous Energy.
- F. Hearing Conservation Program training in accordance with 29 CFR 1910.95, Occupational Noise Exposure.

Medical Monitoring

- G. Hazardous materials physical in accordance with 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response.
- H. Respirator physical in accordance with 29 CFR 1910.134, Respiratory Protection.
- I. Hearing evaluation (audiogram) in accordance with 29 CFR 1910.95, Occupational Noise Exposure.

Site Summary

Site Topography and Anticipated Weather Condition: The site consists of the areas surrounding a historical wastewater treatment pond, a drainage swale, and a nearby stream. It should be noted that all samples will be collected on the outside of the C.W. Process facility. The topography of the site is generally flat and the property is surrounded by industrial and residential properties.

It is anticipated that weather conditions will include warm days (85° F) days with mild night temperatures (63° F).

Chemical Hazard: Moderate

Physical Hazard: Low

Safety Hazard: Low

Waste Characteristics

Waste Type(s) (Choose all that apply with an X next to the type)

X Liquid X Solid Sludge Gas/Vapor

Waste Characteristic(s) (Choose all that apply with an X next to the characteristic)

Flammable Combustible Volatile Corrosive
X Toxic Explosive Reactive Carcinogen
Radioactive*

* Requires completion of additional form and special approval from the Corporate Health and Safety group.

Describe waste location: Cyanide contamination has historically been detected in groundwater. The cyanide contamination has been associated with the historical use of a wastewater treatment pond which received cyanide contaminated waste. Groundwater samples will be collected, as well as a drinking water sample from a residential well. Surface water and soil samples will also be collected along a drainage swale and from a nearby creek.

Estimated waste quantity: Unknown

Hazard Analysis

Chemical Hazard(s) (list all known chemicals, add additional rows as necessary)

Chemical	PEL TLV	Route of exposure	Symptoms	IDLH
Cyanide	5 mg/m ³	Inhalation, Skin absorption, Ingestion, Skin/eye contact	Irritation to eyes, skin; Asphyxia; Lassitude, Headache, Confusion; Nausea, Vomiting; Increased respiratory rate; Slow gasping respiration; Thyroid, Blood changes	25 mg/m ³

Oxygen deficient atmospheres identified: Yes No

Explosive atmosphere identified: Yes No

Physical Hazard(s) (Choose all that apply by inserting the Task Number(s) next to the hazard)

Hazard	Task Number(s)		Hazard	Task Number(s)
Noise*	2		Ionizing Radiation	
Temperature**			Vibration	2
Nonionizing radiation (e.g. IR/UV)			Illumination	

* Employees who are exposed to noise in excess of 85 dB(A) will be included in the Booz Allen Hamilton Hearing Conservation Program.

** Work activities occurring under excessive hot or cold conditions (as determined by the Site Health and Safety Officer) will adhere to the Booz Allen Hamilton Heat Stress/Cold Stress Management Procedures program.

Safety Hazard(s) (Choose all that apply by inserting the Task Number(s) next to the hazard)

Hazard	Task Number(s)		Hazard	Task Number(s)
Heavy Equipment	2		Fire	
Climbing/Fall Hazard			Welding/cutting/ brazing	
Scaffolds			Slips/trips/falls	2, 3, and 4
Portable Ladders			Hand/Power Tools	2, 3, and 4
Excavations			Compressed Gas	

Biological*	2, 3, and 4	Falling Objects	
Heavy/repeated Lifting	2, 3, and 4	Utilities (overhead/buried)	2 and 3
Electrical		Hazardous Energy	
Vehicle Traffic	1 and 2	Confined Spaces (See Below)	
Other (explain)			

* Sampling locations may be in undeveloped areas with potential for biological activity.

Confined Space (Choose the confined space category with an **X** next to the type of space)

Permit-Required Confined Space

X Non-Permit Confined Space

Entry into a permit-required confined space requires implementation and adherence to the Booz Allen Hamilton Confined Space Entry Program including the implementation of the permit system for entry. Booz Allen Hamilton employees are not prepared to perform emergency rescue procedures. Prior to entry into a permit-required confined space, emergency rescue will be established by coordination with a local emergency rescue service (i.e. local fire department) and/or utilizing a non-entry retrieval system.

Hazard Evaluation

Monitoring will be performed whenever there is the possibility of exposure to chemical or physical hazards as identified in the hazard analysis section. The results of the hazard evaluation will determine the selection of the appropriate controls or methods of protection to properly protect on-site personnel. Hazard monitoring will continue for as long as the potential for exposure to the hazard exists. The results will document any changes in site conditions and ensure the proper selection of control measures and PPE is maintained.

Direct Reading Instruments/Colorimetric Detector Tubes

Monitoring Equipment	Hazard	Sample Type*	Frequency
N/A			

*Choose: Personal (monitor in breathing zone) or Area (environmental).

Media Air Sampling

Media	Analytical Method	Chemical	Sample Type*	Frequency
N/A				

*Choose (may choose more than one): Personal (breathing zone), Area (environmental), Grab, Short Term, or TWA.

All monitoring methods will be calibrated daily or before the sample is collected. The flow rates of the air monitoring pumps used for media sampling will be calibrated before and after sample collection using a primary standard. The pre and post calibrations will be averaged to obtain the final flow rate. Direct reading instruments will be calibrated following the manufacture's instruction using a zero gas and an appropriate span gas.

Action Levels

Monitoring Method	Action Level	Action
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N/A		
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Special Restrictions

- Employees are strictly prohibited from working in potentially explosive atmospheres.
- If employees must work in an IDLH atmosphere, pre-approval by the SHSO and the PHSO must be obtained. Employees will be provided Level B PPE or Level A PPE as determined by the SHSO and the PHSO.
- If chemicals do not exhibit any warning indicators of potential exposure, such as irritation or odor, only SAR or SCBAs will be provided to personnel.

Personal Protective Equipment

Based on the recognized hazards in the hazard analysis section and the results of the hazard evaluation the level of PPE will be determined. The level of PPE will be selected from Level D (lowest level of protection) to Level A (highest level of protection).

Level A	Level B	Level C	Level D
PP-SCBA/PP-SAR with SCBA*	PP-SCBE/PP-SAR with SCBA*	APR w/ appropriate filter cartridge*	Coveralls
Total encapsulating chemical protective suit	Hooded chemical resistant clothing	Hooded chemical resistant clothing	Gloves (cotton, leather)
Chemical resistant outer gloves	Chemical resistant outer gloves	Chemical resistant outer gloves	Chemical resistant boots, steel toe and shank
Chemical resistant inner gloves	Chemical resistant inner gloves	Chemical resistant inner gloves	
Chemical resistant boots, steel toe and shank	Chemical resistant boots, steel toe and shank	Chemical resistant boots, steel toe and shank	

- * When respiratory protection is required to protect against airborne contaminants, the Booz Allen Hamilton Respiratory Protection Program will be implemented. Personnel will be trained in accordance with the Respiratory Protection Program and will be determined to be medically fit before they will be allowed to wear a respirator.

Levels of Protection (Choose the level of protection for each task by inserting the **Task Number(s)** in the task # column)

Task #	Level of Protection
	Level A - select when the greatest level of skin, respiratory, and eye protection is required.
	Level B - select when the highest level of respiratory protection is required but a lesser level of skin protection is needed.
	Level C - select when the concentration(s) and type(s) of airborne substances is known and the criteria for using APRs are met. Tyvek will be worn.
2, 3, and 4	Level D - select for general working conditions requiring minimal protection, for nuisance contamination only.

Additional PPE (Choose the additional PPE to be worn by inserting the **Task Number(s)** next to the PPE)

PPE	Task Number(s)	PPE	Task Number(s)
Hard hats	2	Ear Muffs	

Eye wear (side shields)	2, 3, and 4	Rubber insulated gloves	
Ear Plugs	2	Rubber insulated blanket	
Face Shields		Welding PPE	
Steel-Toed Shoes w/ rubber booties	2, 3, and 4	Nitrile Gloves	2, 3, and 4

Site Control

Perimeter Identified Yes

Site Secured Yes

Work Area Designated Yes

Zones Identified Yes

Prepare and attach a site map to this SSHSP to identify the work site. Locate on the drawing all significant structures and geographical features as reference points. Identify the work site control boundaries or work zones, the staging area, and the decontamination area, as applicable.

General Requirements

- Site control boundaries will be established and readily recognizable prior to any work activities.
- Only authorized personnel will be allowed inside the site control boundaries. All authorized personnel will have appropriate training and medical monitoring to safely conduct their job tasks.
- The buddy system will always be in effect during site activities. No personnel will be allowed to work alone. During site activities, personnel should remain within each other's eye sight at all times.
- Prior to the start of the project, a recognizable alarm will be determined to alert personnel of an emergency situation. Whenever this alarm is activated, all site activities should immediately stop and personnel are to proceed to a predetermined point of refuge to await further instructions from the project manager or SHSO.
- All accidents that involve personal injury or damage to property or equipment will be immediately reported to the SHSO and the project manager.
- All work sites will be equipped with a properly supplied first aid kit located at the project staging area. If project activities subject personnel to exposure to corrosive materials, an eye wash station, as a minimum, will be provided and located in close proximity to the corrosive material work area. The eye wash station will meet ANSI Z358.1-1990 requirements for portable eye wash stations.
- Eating, drinking, smoking, chewing tobacco, and applying cosmetics is prohibited within the work site control boundary.
- Personnel will utilize good personal hygiene by thoroughly washing hands and face whenever they leave the work area, especially for lunch breaks and at the end of the work shift.

Decontamination

Decontamination procedures are established to protect the health of employees and prevent the spread of contamination outside of the work area. Decontamination procedures will also be implemented to ensure cross contamination between samples is prevented.

Personnel Decontamination Procedures: N/A – PPE is disposable

Equipment Decontamination Procedures: Decontamination of non-disposable sampling equipment will be conducted prior to and after each sampling location as prescribed in Booz Allen's Standard Operating Procedure *Equipment Decontamination* to assure the quality of samples collected. Any IDW generated will be disposed of properly as stated in Booz Allen's Standard Operating Procedure *IDW Management*.

Emergency Response

All accidents regardless of severity that involves personal injury, illness, or property/equipment damage, and also near miss incidents, will be immediately reported to the SHSO and the site project manager. Once the SHSO and site project manager have established control over the situation they must immediately notify the PHSO and the BAH TOM. This notification must provide detailed information regarding the injury, illness, near miss incident, or property/equipment damage and the events that caused the accident. The PHSO will then contact the employee(s) involved as soon as the employee(s) is/are available following the time of the accident to obtain their account of the accident. The PHSO will then complete the form On-The-Job Injury or Illness Incident Report used to document the events of the accident or incident based in the information obtained from the SHSO and the employee(s). The PHSO will determine further reporting requirements based on the severity of an injury or illness and involve Human Resources as necessary to meet OSHA requirements.

Emergency Telephone Numbers

Hospital: 319- 398-6011

Fire Department: 911

Police: 911

Hospital Information

Mercy Medical Center
701 10th Street SE
Cedar Rapids, IA 52403

Driving Directions: (refer to attached map).

Booz Allen Hamilton Emergency Contact Telephone Numbers

	Office #	Cell #	On-Site #	Alternate #
Program Manager	703-902-5503	703-599-6124	--	
Project Manager	816-448-3253	703-473-8717	--	
SHSO	816-448-3253	703-473-8717	--	

PHSO	919-472-5305	919-302-3626	--	919-851-9259
Alternate PHSO: Mitch Pence	513-569-7786	513-708-5070		

Site Information

Client Contact: Cynthia Hutchison, EPA Region 7 TOCOR **Phone #:** 913-551-7478

Emergency Alert Alarm: Verbal Communication

Emergency Refuge Location: Rental Vehicle

Location of on-site telephone: BAH personnel will carry personal cellular telephones

Additional Communications:

Location of first aid kit and emergency wash station (if required): Rental Vehicle

Site Resources

Regulatory Agency Contacts

EPA area office: 913-551-7003

IDNR Office: 515-281-5918 Des Moines

Regional IDNR Office: 563-927-2640 Manchester

Poison Control Center: 800-222-1222

DOT National Emergency Response Center: 800-424-8802

Center for Disease Control: 800-232-0124

Chemtrec®: 800-424-9300

Chem-Tel, Inc: 800-255-3924

Poison Hotline 800-282-5836

Provide the following:

- State that this is an emergency
- Give your name and location
- Give the telephone number to reach you
- Give the name of the injured person
- Give the nature of the emergency
- Describe any action taken
- Await instructions

Spill Response

Spill response procedures provide instruction for the containment and cleanup of an accidental contaminant release. Contaminants or contaminated materials may be generated due to site remedial activities, material sampling, and decontamination.

Spill Response and Containment Procedures: N/A

Contaminated Material Handling Procedures: N/A



Safety Meeting

Type (circle): Pre-Project Meeting or Periodic Meeting

Project #: R7031

Project Title: Support for Sampling at the C.W. Process Company

Instructor: _____ Date: _____

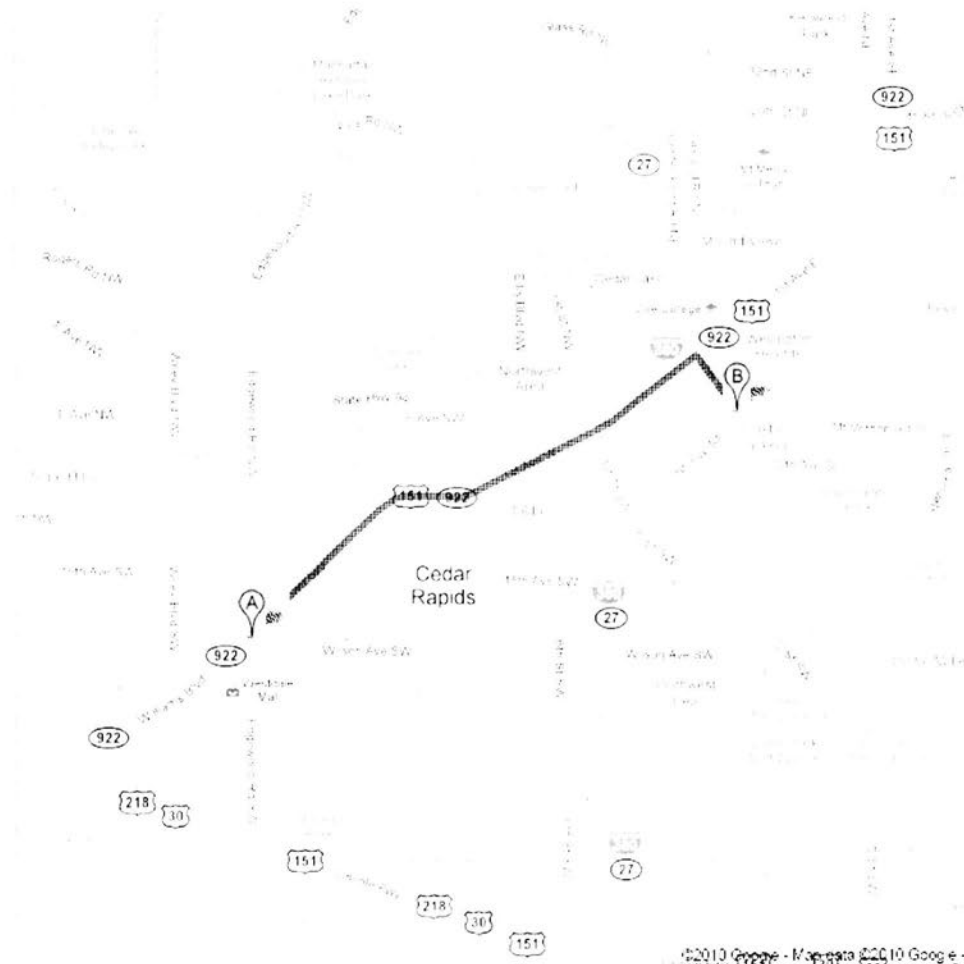
Topics Presented: _____

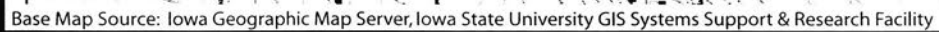
Attendees:

Name (print)	Signature

Driving Directions to Mercy Medical Center

1. Head northeast on Williams Boulevard SW toward Trent Street SW
2. Continue onto 1st Avenue NW
3. Turn right at 10th Street SE
4. End at 701 10th Street SE



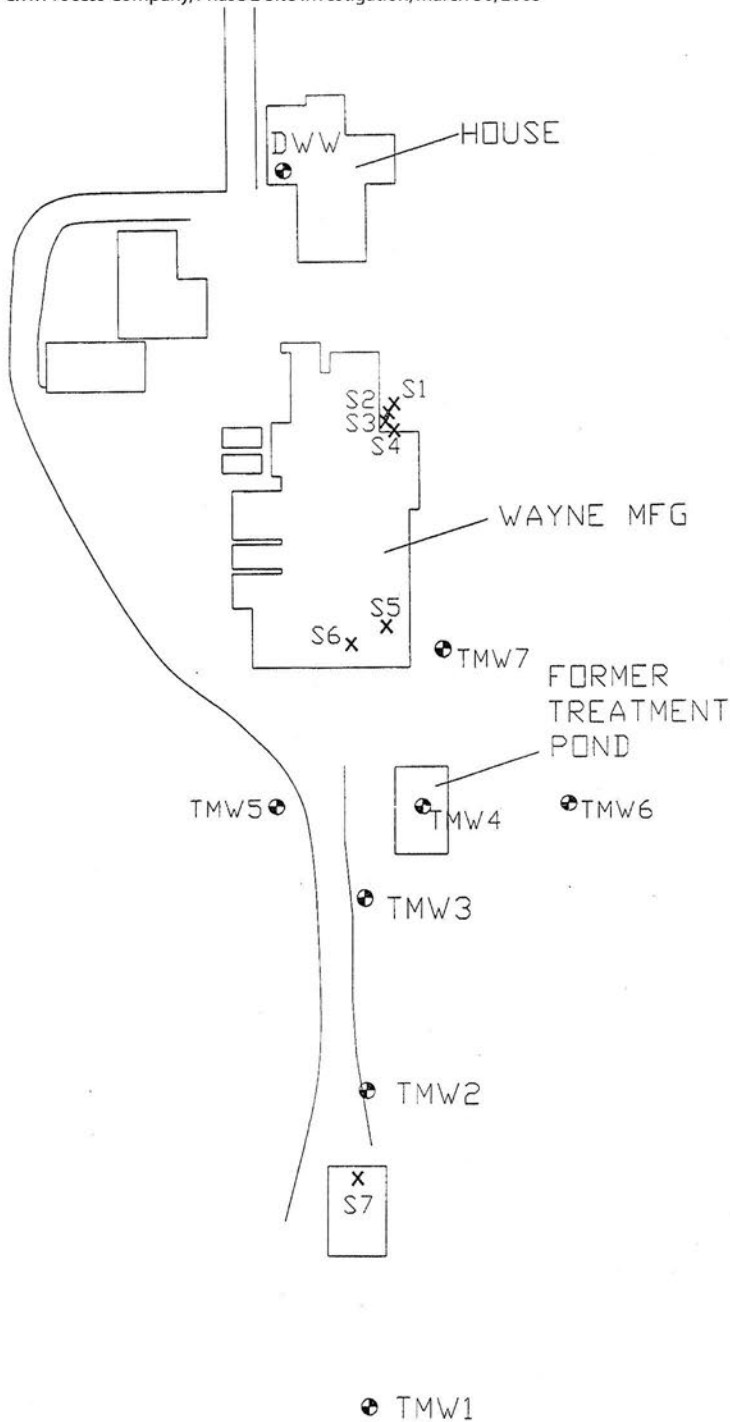


Map 1: General Area Topographic Map
C.W.Process Company, Cedar Rapids, Iowa

Map 2: Phase 2 Sampling Map

C.W. Process Company, Cedar Rapids, Iowa

Base Map Source: C.W. Process Company, Phase 2 Site Investigation, March 30, 2005



LEGEND

SOIL SAMPLE
MONITORING WELL



SITE PLAN MAP
C.W. PROCESS COMPANY
5051 WILLIAMS BOULEVARD
CEDAR RAPIDS, IOWA

**Blackhawk
Environmental
Testing**

P.O. Box 85
Denver, IA 50622
(319) 984-6600

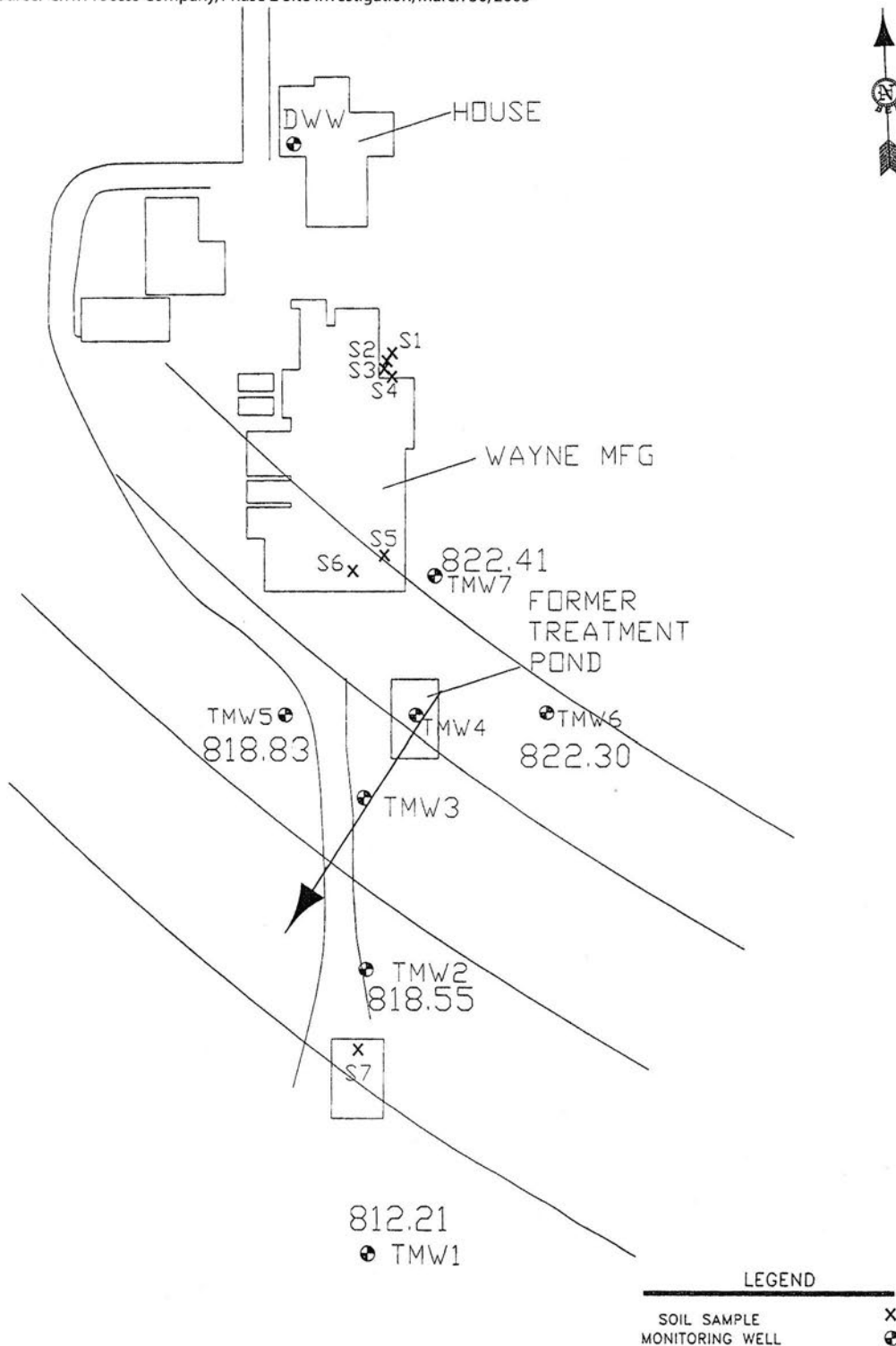
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DRAWN BY: ORT
DATE: 7/16/04

FIGURE: 1
REVIEWED BY:
SCALE: 1"=40'

Map 3: Groundwater Flow Map

C.W. Process Company, Cedar Rapids, Iowa

Base Map Source: C.W. Process Company, Phase 2 Site Investigation, March 30, 2005



GROUNDWATER FLOW DIRECTION
MAP (12/20/05 DATA)
C.W. PROCESS COMPANY
5051 WILLIAMS BOULEVARD
CEDAR RAPIDS, IOWA

Blackhawk
Environmental
Testing

P.O. Box 85
Denver, IA 50622
(319) 984-6600

PROJECT #: 04432

FIGURE: 4

DRAWN BY: ORT

REVIEWED BY: [Signature]

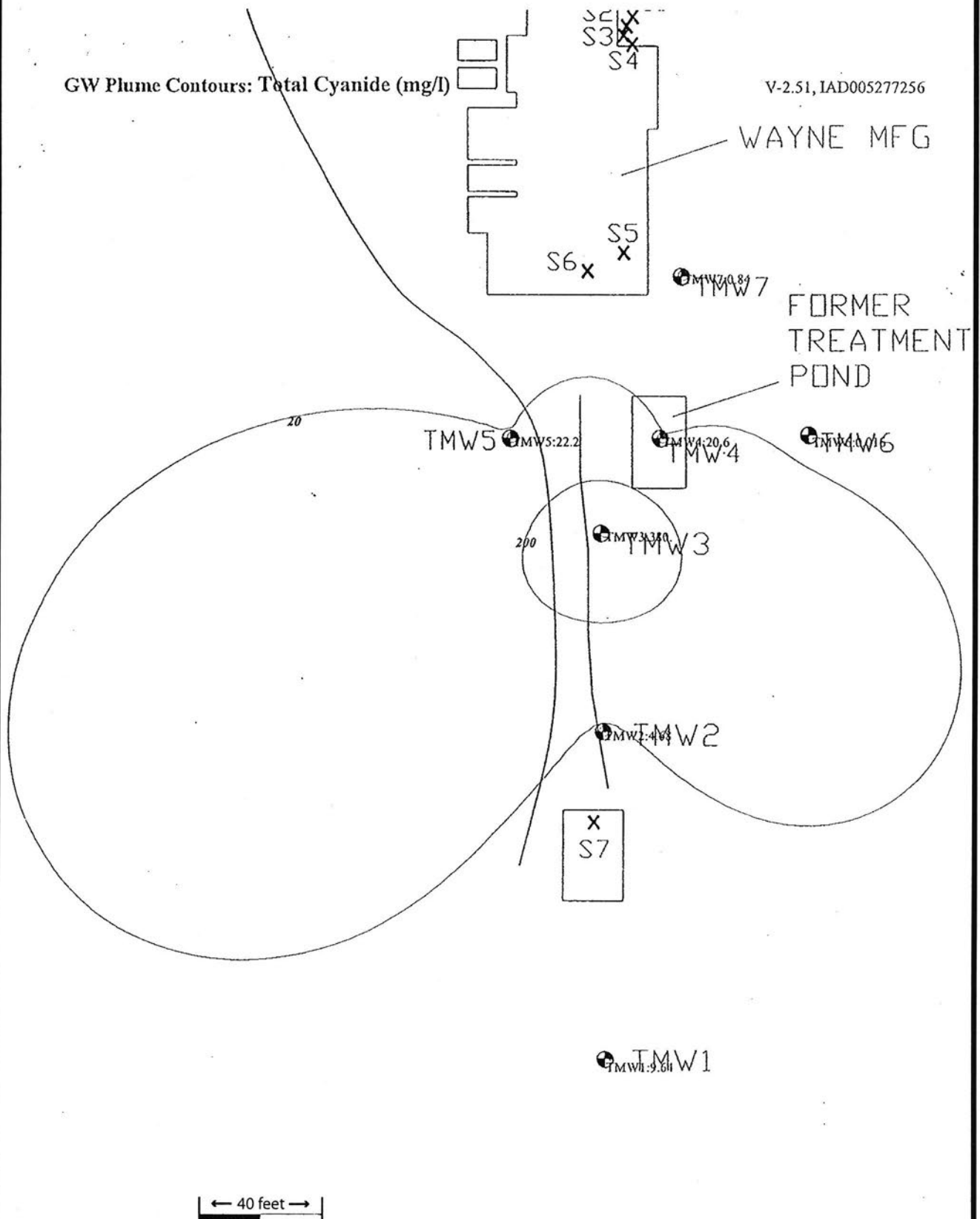
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SCALE: 1"=40'

Map 4: Phase 2 Plume Map

C.W. Process Company, Cedar Rapids, Iowa

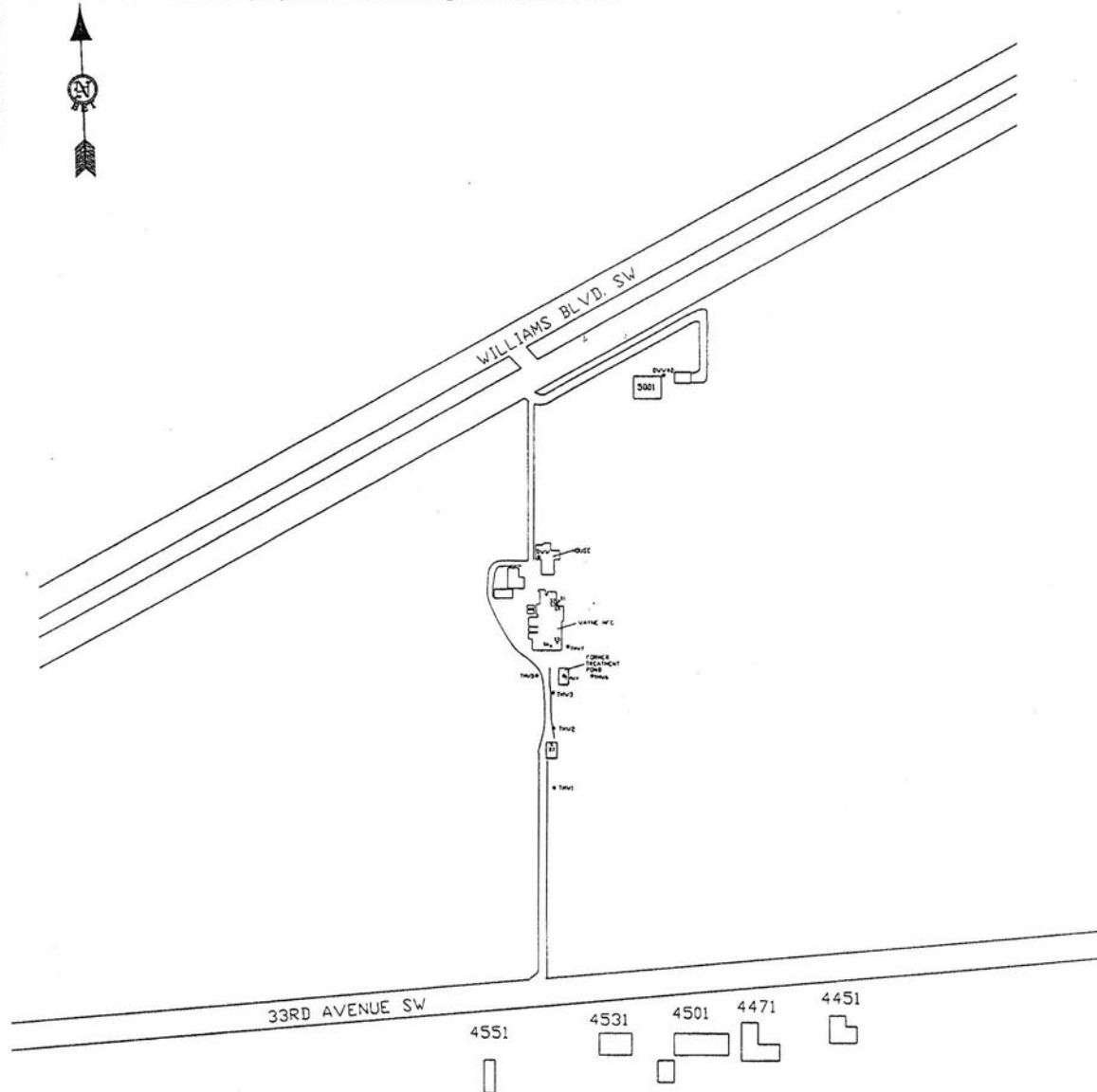
Base Map Source: C.W. Process Company, Phase 2 Site Investigation, March 30, 2005



Map 5: Adjacent Properties Map

C.W.Process Company, Cedar Rapids, Iowa

Base Map Source: C.W.Process Company, Phase 2 Site Investigation, March 30, 2005



LEGEND
SOIL SAMPLE MONITORING WELL X

SITE VICINITY MAP
C.W. PROCESS COMPANY
5051 WILLIAMS BOULEVARD
CEDAR RAPIDS, IOWA

Blackhawk
Environmental
Testing

P.O. Box 85
Denver, IA 50622
(319) 984-6600

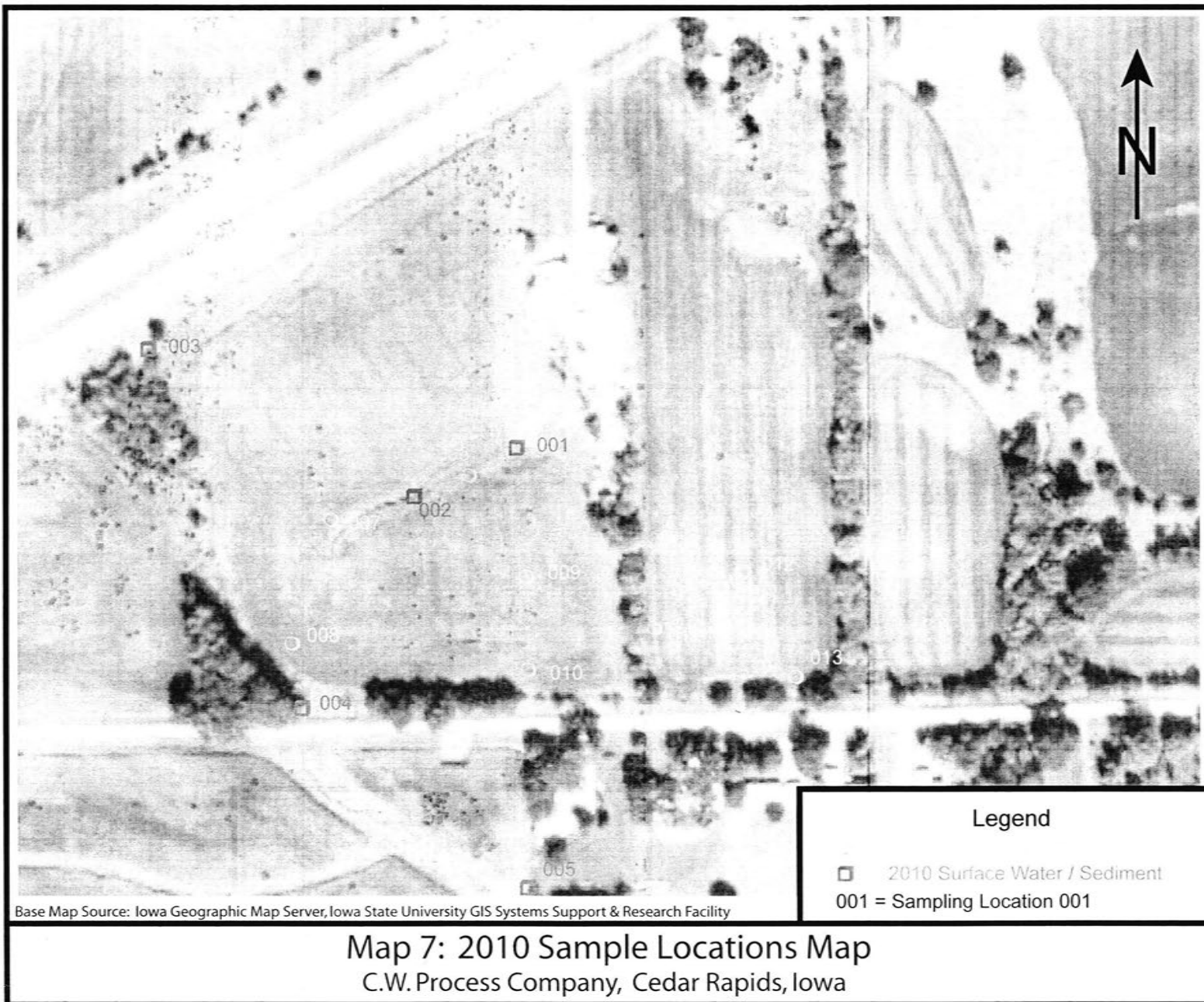
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DATE: 3/30/05

FIGURE: 3
REVIEWED BY: (signature)
SCALE: 1"=200'



Base Map Source: Iowa Geographic Map Server, Iowa State University GIS Systems Support & Research Facility

Map 6: 2009 Aerial Photograph
C.W. Process Company, Cedar Rapids, Iowa



The following persons approve the contents of this *Sampling and Analysis Plan for the RCRA Site Sampling Visit at the Former C.W. Process Company; AKA Wayne Manufacturing, Cedar Rapids, Iowa* and are committed to implementing the provisions described herein:

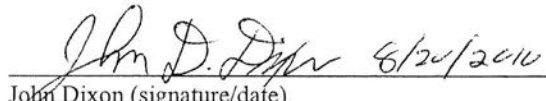


8/20/2010

For: Yvonne Fernandez (signature/date)
Booz Allen Hamilton Program QA Manager



Cynthia Hutchison (signature/date)
EPA Region 7 Task Order
Contracting Officer's Representative



John Dixon (signature/date)
Booz Allen Hamilton Task Order Manager